SEPTEMBER
1 9 6 1

FOUNDRY

A PENTON PUBLICATION

Nodular Iron . . .

Production Methods at New 15,000-Ton Foundry

— Page 62

Converting to Synthetic Sand System
— Page 68

Risering Permanent Mold Aluminum
— Page 71

How to Calculate Weight of Castings
— Page 74

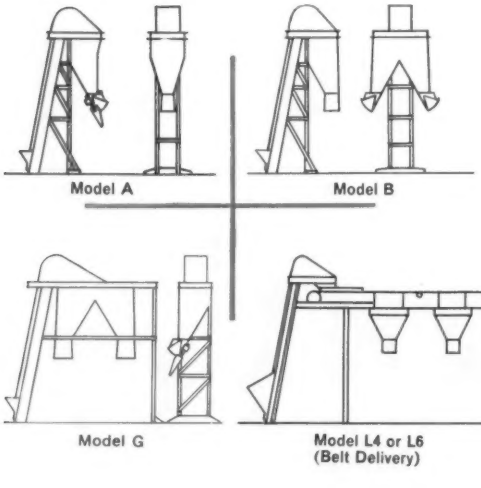
Machinability of Gray Iron Castings
— Page 78

CONTENTS — Pages 3-4

MECHANI-MIZE*
FOUNDRY-WISE
WITH
NATIONAL
MOLDER'S HELPER
*Meaning . . . now it's easy and economical to get your sand up off the floor without major plant changes or big equipment investment.
Use with any Mix-Muller:

Built for foundrymen—to increase molder's production

CHOOSE FROM A VARIETY OF ARRANGEMENTS:



Here's a compact and rugged, yet low cost, mechanized sand system, designed to get your sand up off the floor.

Molder's Helper is more than a molders hopper with elevator attached. It's an *elevayor* . . . smoother running, faster and more trouble-free than an elevator. It's an *aerator* . . . built-in unit delivers fluffy, free flowing sand to *molders hopper(s)* which are designed and built by foundrymen . . . for fast action, free flowing *foundry* use.

Cold hard dollars saved in time and increased efficiency can quickly pay for Molder's Helper. Why not see your NATIONAL representative for further details?

WRITE FOR NEW BULLETIN

NATIONAL ENGINEERING COMPANY
646 Machinery Hall Bldg.
Chicago 6, Illinois

F-560

For More Information Circle 554, Page 39

NEW FROM REYNOLDS,

ONLY* FROM REYNOLDS . . .

A357 Aluminum Casting Alloy

An Economical Beryllium-Aluminum Casting Alloy

To keep your casting costs down—Reynolds has developed a new outstanding alloy with the key characteristics of TENS 50. Check its specifications and check these characteristics that add up to maximum quality at a cost 30% less than earlier Beryllium added aluminum casting alloys.

- **Superior Strength**
- **Extended Elongation**
- **The Best In Fluidity and Castability**
- **Outstanding Corrosion Resistance**
- **Extended Limits For Shock and Impact**

A357 Sand and Permanent Mold "T6" Heat Treatment Properties		
	Sand	Permanent Mold
Tensile Strength (PSI)	48.0	53.0
Yield Strength (PSI)	36.0	41.0
Elongation	3%	12%

* Reynolds Metals Company and their Distributors are the only source for TENS 50 and A357 alloys. For complete information, write to *Reynolds Metals Company, P. O. Box 2346-FL, Richmond 18, Virginia.*

A357 alloy is covered under TENS 50 Patents granted to Navan Products, Inc., a division of North American Aviation, Inc. and licensed to Reynolds Metals Company.

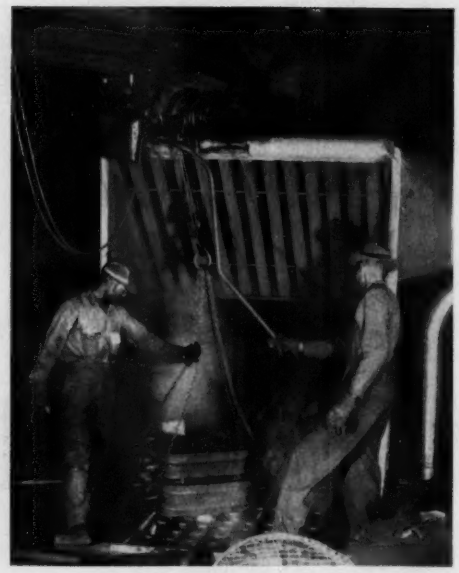
REYNOLDS ALUMINUM

Watch Reynolds TV Show "Harrigan & Son", Fridays—ABC-TV

For More Information Circle 557, Page 39

FOUNDRY VENTILATION *by* SCHNEIBLE

Features Compensating Air for Building Ventilation Balance



Schneible engineers designed Compensating Air Hoods to provide more and better ventilation in foundries, both summer and winter. The Compensating feature confines air patterns to the immediate work area, thus no drafts to annoy workers or disturbance of building ventilation balance. In summer, hot air can be scavenged from the roof area thus providing more comfortable working conditions. During winter months supply air is taken from outside the building conserving needed plant warm air. In both cases the balance of building air is maintained.

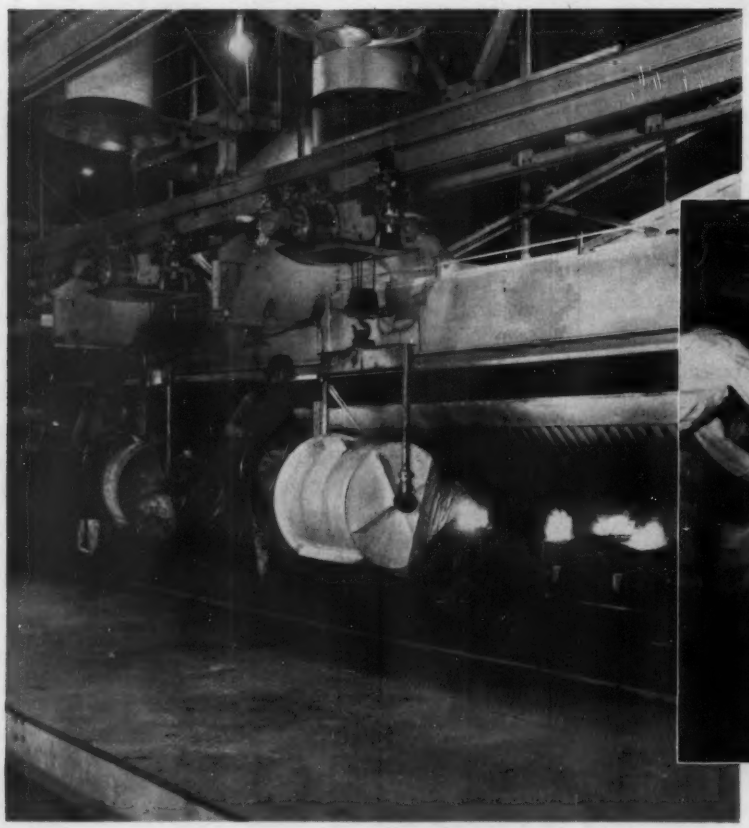
A Schneible Compensating Air Hood System allows complete regulation of all foundry air, with the result that savings are made in power plant operation in winter, while providing the most comfortable working atmosphere in all seasons.

Schneible Uni-flo Compensating Hoods are available for all foundry operations—shakeout, pouring, smoke-off, mold cooling, etc.

Write for bulletin and complete information on Compensating Air Hoods.

CLAUDE B. SCHNEIBLE COMPANY
P. O. Box 296 Roosevelt Pk. Annex • Detroit 32, Michigan
Cable Address: CBSCO
European Licensee: Elex S. A., Zurich, Switzerland
Canadian Licensee: Dace Industries, Windsor
"PATENTS"
"All Schneible Equipment is covered by patents in United States and foreign countries. Infringements will be prosecuted."

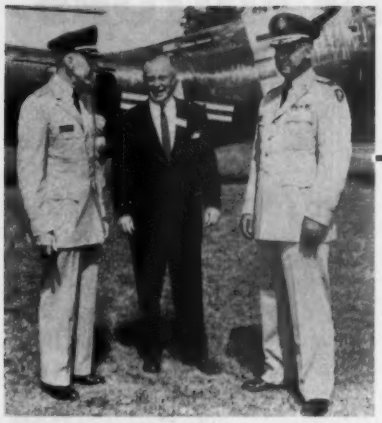
SCHNEIBLE



Schneible Uni-flo Compensating Air Hoods in operation on cylinder block line in a large Eastern automotive foundry

September 1961
Volume 89—Number 9

FOUNDRY
A PENTON PUBLICATION



Army Ordnance recently placed a sizable order with Albion Malleable Iron Co. for 81-mm shell cast from pearlitic malleable iron (see Page 104). Shown here on the occasion of the award are Maj. Gen. W. K. Gormley, Albion President Collins Carter, Brig. Gen. N. O. Moore

Comply or Quit! 61
Editorial—By WILLIAM G. GUDE

Nodular Iron Foundry Has 15,000-Ton Capacity 62
Converted from gray iron to nodular iron exclusively, the foundry at Memphis Works, International Harvester Co., has a capacity of 15,000 tons per year. It features automatic operation—By JACK C. MISKE

Converting from Natural to Synthetic Sand . . 68
At U. I. Div., Burndy Corp., Norwalk, Conn., the first step in a program of firmer controls for foundry operating procedures was conversion from a natural to a synthetic sand system—By ANDRE HERRAULT and HARRY HERON

Risering Permanent Mold Aluminum Castings . 71
In permanent molds, risers vent the mold cavity in addition to supplying feed metal. This article, the 24th in our gating and risering series, discusses riser, ingate, and nozzle relationships—By GEORGE A. BIER

Techniques for Calculating Casting Weights . . 74
Calculation of a casting's weight can mean the difference between profit and loss on an order. As a result, accuracy is essential. Here are some pointers which may help you to do a better job of estimating—By R. L. COOPER

A Study of the Machinability of Gray Iron . . . 78
Tests on various cast irons indicate that good machinability is related to the degree of uniformity of hardness. Use of copper as an alloying agent produces homogeneous hardness—By A. De SY and J. Van EEGHEM

Esprit de Corps in a Foundry 82
What factor makes a worker do his best—pay rates, fringe benefits, easy working conditions? Perhaps it's a co-operative management attitude toward the worker and his problems—By ROBERT H. HERRMANN

The World of Cast Metals 23
New Ford V-8 Uses Light Iron Castings 23
Non-Ferrous Founders To Meet in September 23
AFS Predicts Record Foundry Show in 1962 26
East Coast Regional Conference Lists Program 26
Steel Founders Society To Hold Fall Meeting 26
Magnesium Association Plans Promotion Campaign 29

Develops Pearlitic Malleable 81-mm Shell . . . 104
Albion Malleable Iron Co., Albion, Mich., develops process for producing mortar and artillery shells from pearlitic malleable iron

More on Pinhole Porosity in Gray Iron 116
Commenting on a previous article, the author blames pinhole porosity in gray iron on aluminum causing hydrogen pickup in the mold—By J. V. DAWSON

Gray Iron Foundries Disregard Specifications . 121
Survey indicates that casting producers are careless in determining that their products meet specifications—By H. W. LOWNIE and C. F. WALTON

CONTINUED NEXT PAGE

Editor: WILLIAM G. GUDE

Metallurgical Editor: EDWIN BREMER

Associate Editors: ROBERT H. HERRMANN
JACK C. MISKE

Assistant Editors: WALLACE HUSKONEN
DOLORES COZZONE

Art Editor: DON S. CADOT

Publisher and Editorial Director: FRANK G. STEINEBACH

CONTINUED FROM PAGE 3

Man to Man 132
The casting process should be regarded as a legitimate engineering and experimental tool which is available to the engineer—By RALPH L. LEE

Diecasting Improves Rotor Assembly 136
At Dominion Electric Corp., Mansfield, Ohio, rotors for small electric motors are assembled by a diecasting technique—By DELBERT RITZHAUPT

Conversion to Casting Cuts Costs 54 Per Cent . 146
Iron Fireman Mfg. Co., Cleveland, switched from a welded steel burner head to a gray iron casting and saved 54 per cent—By W. D. HUSKONEN

Steel Founders Launch Advertising Program . . 154
This month, the Steel Founders' Society of America launches a publication advertising campaign featuring the benefits of steel castings to users

International Foundry Congress Meets 157
By M. M. HALLETT

High Green Strength Can Offer Advantages . 167
High green strength is important when castings must have accurate contour, controlled weight, and dimensional accuracy—By HARRY W. DIETERT

Mobile Presses Expedite Diecasting Trimming . 178
Anderson Tool & Mfg. Co., Chicago, uses mobile hydraulic presses to prevent damage to warm diecastings and to simplify scheduling

Planned Annual Maintenance of Air Systems . . 188
Malleable Iron Fittings Co., Branford, Conn., discovered that a planned annual program is the answer to air system problems—By ADOLPH G. RINGER

Care and Use of Vibrating Screens 196
Long life and efficient operation of vibrating screens and shakeouts depends on proper installation, care, and maintenance—By M. P. HAHN

In Every Issue

Around the Country	150	**Literature for Foundrymen** .	181
Calendar of Meetings . . .	34	**Men of Industry**	205
Equipment and Supplies . .	91	**Obituary**	214
Foundry Developments . . .	126	**Patents of Interest**	172
How To Do It	114	**Questions and Answers** . .	85
Industry Briefs	111	**Readers' Comment**	57
Late News	17	**Statistics**	17

With the Editors 10

Classifed Advertising—223 Advertising Index—233 Business Staff—233

©1961 by The Penton Publishing Co. All rights reserved.
EDITORIAL OFFICES: Penton Building, Cleveland 13, Ohio. Main 1-8260. Branch Offices: New York, Detroit, Chicago, Pittsburgh, Washington, London.

FOUNDRY is edited primarily for management, production, technical, and purchasing personnel in foundries. A copy is sent at no cost to each metal casting plant in the U. S. and Canada employing 20 or more workers and to selected smaller foundries. Additional copies are sent to each foundry to the extent necessary to serve all key foundry personnel on a personal or routed basis. A limited number of copies is supplied at no cost to educational institutions. Subscriptions in the U. S., possessions, and Canada for home-addressed copies and copies not qualified for under the above principles: One year, $10. Single copy, $1. Other countries: One year, $20. Single copy, $2. Published monthly by the Penton Publishing Co., Penton Building, Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

FOUNDRY is indexed in the Applied Science & Technology Index and the Engineering Index, generally available in libraries. Microfilm copies are available from University Microfilms, 313 N. First Ave., Ann Arbor, Mich.

THE EDITORS' WORKSHOP

SAND SYMPOSIUM: You will find a wealth of information about core and molding sands in next month's issue. Our Sand Symposium will consist of five full-length articles prepared by authorities in the field. These articles will treat a variety of subjects which affect molding and coremaking practices. Individual papers and their authors include the following:

Mulling and Compacting Molding Sands by Prof. Richard W. Heine, University of Wisconsin, will discuss mixing and compacting techniques, variations in properties, and the effects of clay and moisture contents on mold compaction.

CO_2 Process and Furan Cores by Robert J. Mulligan, Archer-Daniels-

Midland Co., will deal with specific problems and their solutions as well as the advantages and disadvantages of each process.

Oil Bonded and Shell Cores by Edward C. Zuppann, Bendix Corp., will discuss the testing and evaluation of materials, mixing problems, and hidden factors affecting quality.

Unbonded Molding Sand and Clay Bonds by Prof. Willis G. Lawrence, Alfred University, will describe the properties of unbonded synthetic molding sands and the differences in performance of bentonites and fire clay.

Be Your Own Sand Detective by Joseph Schumacher, Hill & Griffith Co., will present details on sand testing and the proper evaluation of test data. The descriptions will cover the clay test, volatile carbon content analysis, dry compression testing, and mold hardness.

THE ROPE TRICK

saves foundries thousands of dollars

KOPESEAL

Frederic B. Stevens, Inc.
1800-18th St.
Detroit 16, Mich.
Branches:
597 Northland
Buffalo, N. Y.
440 South Colony St.
Wallingford, Conn.
5345 Lexington Ave.
Indianapolis, Ind.

H. D. Fowler Co., Inc.
9th Ave., South & Lane St.
Seattle 14, Wash.

Ind. Building Materials, Inc. & The Hubbard Co. Div.
2545 So. Yates
Los Angeles 22, Calif.

M. A. Bell Co.
217 Lombard St.
St. Louis, Mo.
Branch: 5802 Colfax St.
Houston, Texas

Railway & Power Engineering Corp. Ltd.
3745 St. James St.
Montreal 3, Quebec, Canada
Branches: 14 in Canada

Jones Foundry Supply
718 E. 60th St.
Los Angeles, Calif.

Barker Foundry Supply Co.
120 South Linden Ave.
So. San Francisco, Calif.

KOPEROPE

Milwaukee Chaplet & Supply Corp.
8656 West National Ave.
Milwaukee, Wisc.

Springfield Facing Co.
South Second & Bergen Sts.
Harrison, N. J.

KOPEBEAD

George F. Pettinos, Inc.
1206 Locust St.
Philadelphia, Penna.

KOPETITE

The Hill & Griffith Co.
1262 State Ave.
Cincinnati 4, Ohio
Branches:
4606-10 W. 16th St.
Chicago, Ill.
2929-31 7th Ave., N.
Birmingham, Ala.
1901 Commerce St.
Houston, Texas

Until Presstite developed cope and drag sealer in ready-to-apply form, foundries had to contend with the slow, costly, wasteful hand mixing and forming of "mud balls", "dough rolls", and "noodles."

Foundries use Presstite cope and drag sealer in endless supply in the ready-formed uniform extrusion that gives better, cleaner castings.

Nationwide distribution through outstanding foundry supply houses gives ready availability from thoroughly dependable sources.

Presstite cope and drag sealer is identified by these four brand names, and is available only through these distributors.

6147

PRESSTITE SEALING COMPOUNDS

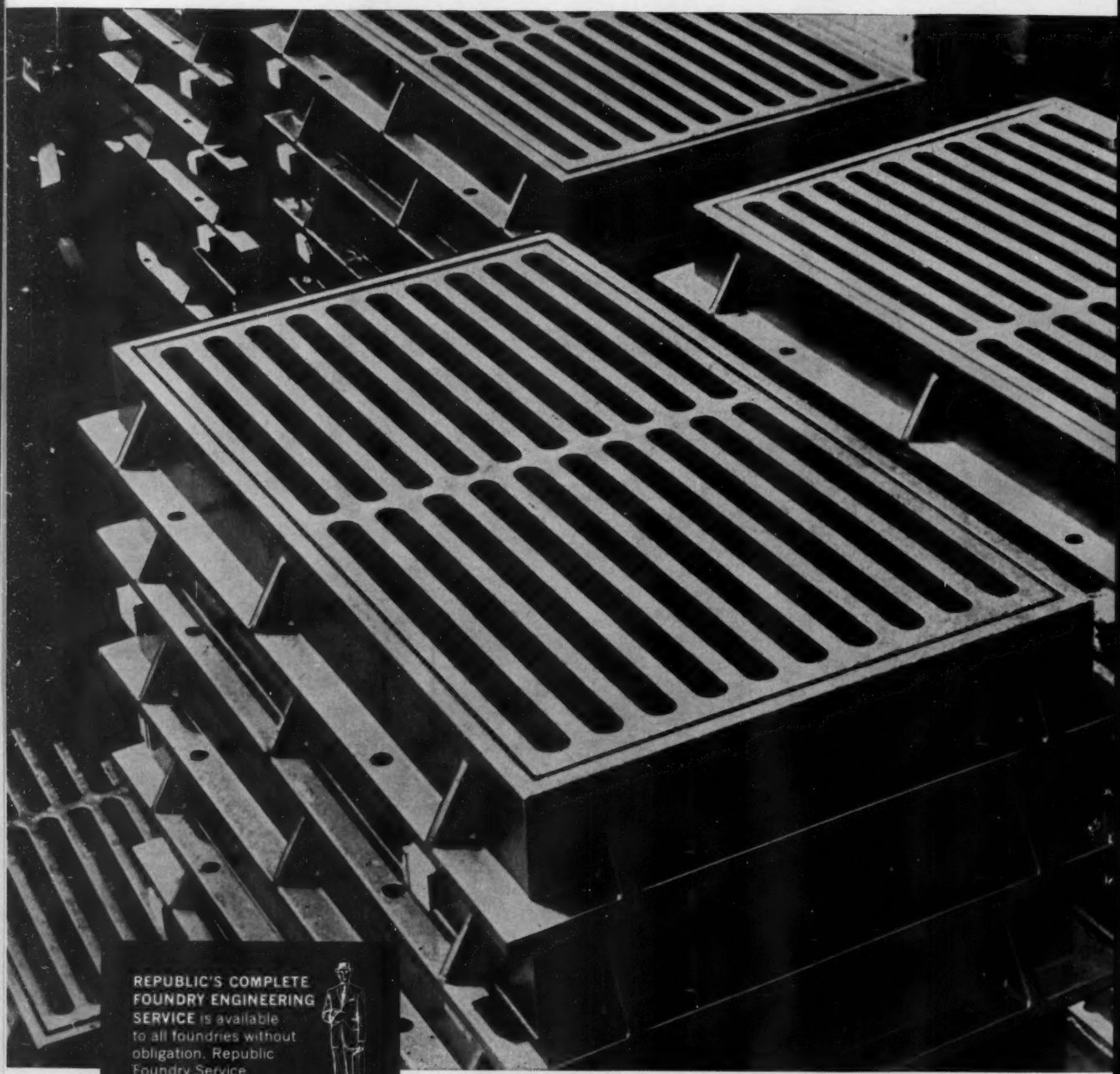
PRESSTITE DIVISION
AMERICAN-MARIETTA COMPANY

AM

3752 CHOUTEAU AVE., ST. LOUIS 10, MO.

For More Information Circle 559, Page 39

CHATEAUGAY PIG IRON PROVES IDEAL



REPUBLIC'S COMPLETE FOUNDRY ENGINEERING SERVICE is available to all foundries without obligation. Republic Foundry Service Engineers can supply ideas, suggestions, and information to benefit every department of your foundry operation. They can recommend, from industry's most complete line of merchant pig iron, the grade best suited to your requirements: Chateaugay; Northern Foundry, Malleable, Bessemer and Basic; Southern Malleable, Foundry and Basic.

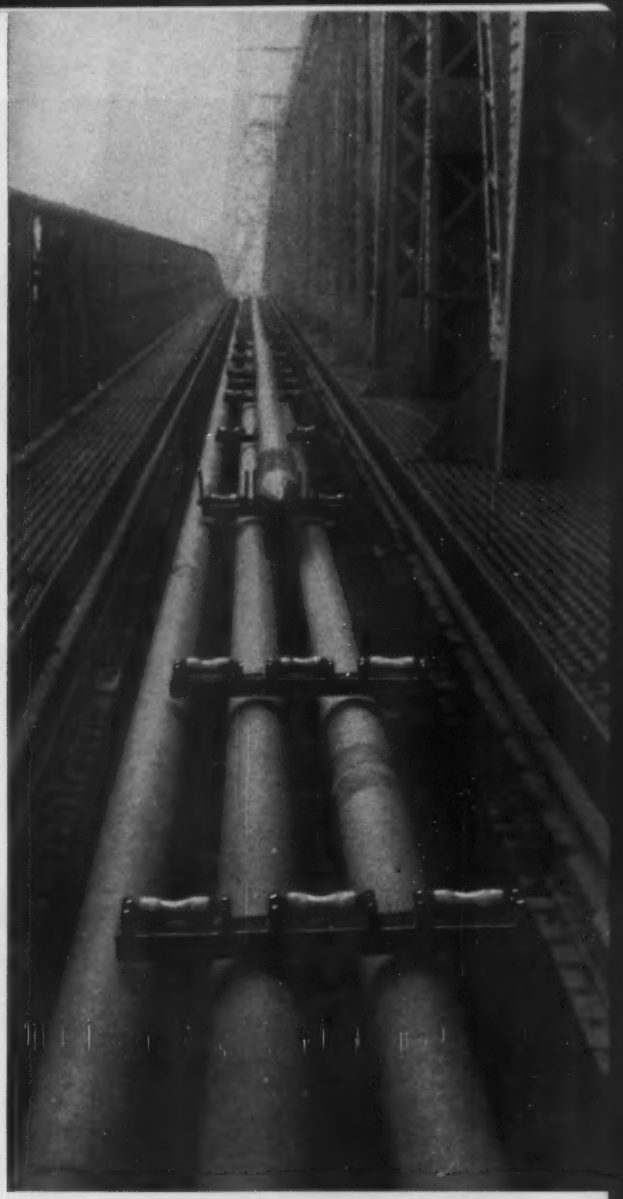
DUCTILE IRON GRATINGS are cast by Crompton & Knowles to cover the drainage conduit system of the Massachusetts Turnpike. The high ductility of the iron, achieved through the use of Chateaugay Pig Iron as the base metal, takes the punishment of heavy traffic and gives the gratings a consistent fit.

BASE METAL FOR DUCTILE IRON CASTINGS

Along the length of the Massachusetts Turnpike and across the span of the Queensboro Bridge, ductile iron castings have been installed by the hundreds. They combine the corrosion resistance of cast iron with the strength of steel, and were cast by the Crompton & Knowles Corporation, Worcester, Mass., with Republic Chateaugay Pig Iron as the base metal.

To achieve high ductility as-cast grades of ductile iron, Crompton & Knowles selected Chateaugay for its high total carbon and unusually low phosphorous, silicon, and manganese content. High ductility was further assured by Chateaugay's consistently uniform chemical analysis. Freedom from excessive amounts of subversive elements assures the formation of graphite nodules. And the inherently excellent chemistry of Chateaugay is maintained in the ductile form.

These and other superior characteristics make Chateaugay ideal for a wide variety of casting applications. A Republic Foundry Service Engineer will be happy to discuss these possibilities with you. There is no cost, no obligation for these services. Simply contact your Republic representative, or mail the coupon.



DUCTILE IRON ROLLER BRACKETS support cable-carrying pipe across the 3,700-foot run of the Queensboro Bridge. The Consolidated Edison installation involves six pipelines covered by a road. Thanks to the superior characteristics of Republic Chateaugay Pig Iron and the ingenuity of Con Ed and Crompton & Knowles, the supports and rollers require virtually no maintenance.

REPUBLIC STEEL

PRODUCERS OF INDUSTRY'S MOST COMPLETE LINE OF MERCHANT PIG IRON

For More Information Circle 560, Page 39

REPUBLIC STEEL CORPORATION
DEPT. FO-2140
1441 REPUBLIC BUILDING · CLEVELAND 1, OHIO

☐ Have a Foundry Service Engineer call.
☐ Send more information on Republic Pig Irons.

Name_____ Title_____

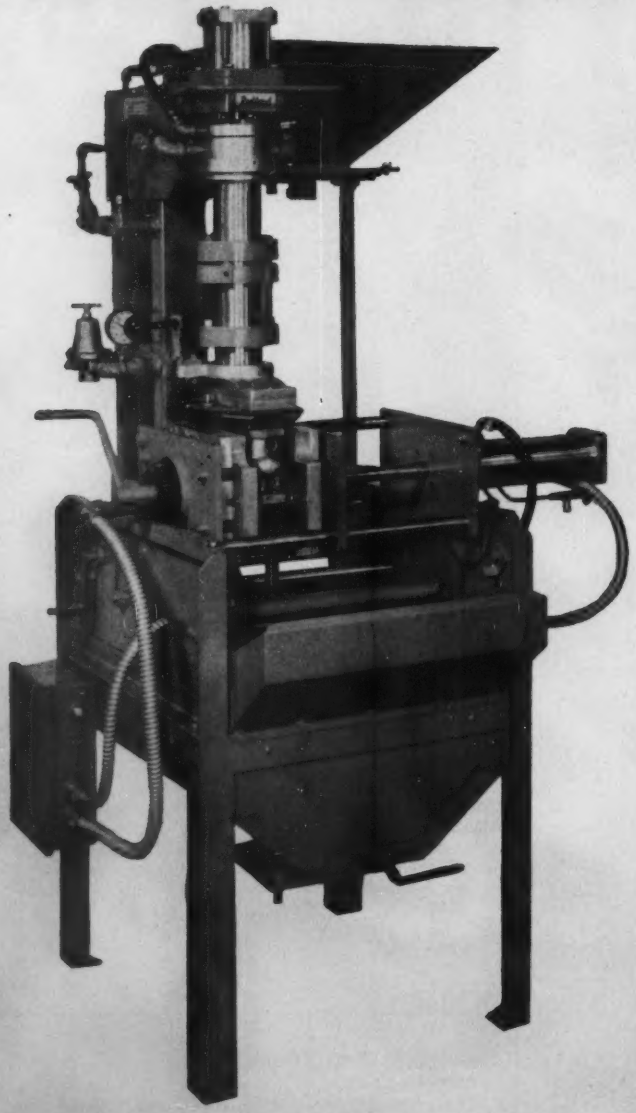
Firm_____

Address_____

City_____ Zone____ State_____

Redford

MODEL HP-4
SHELL CORE BLOWER



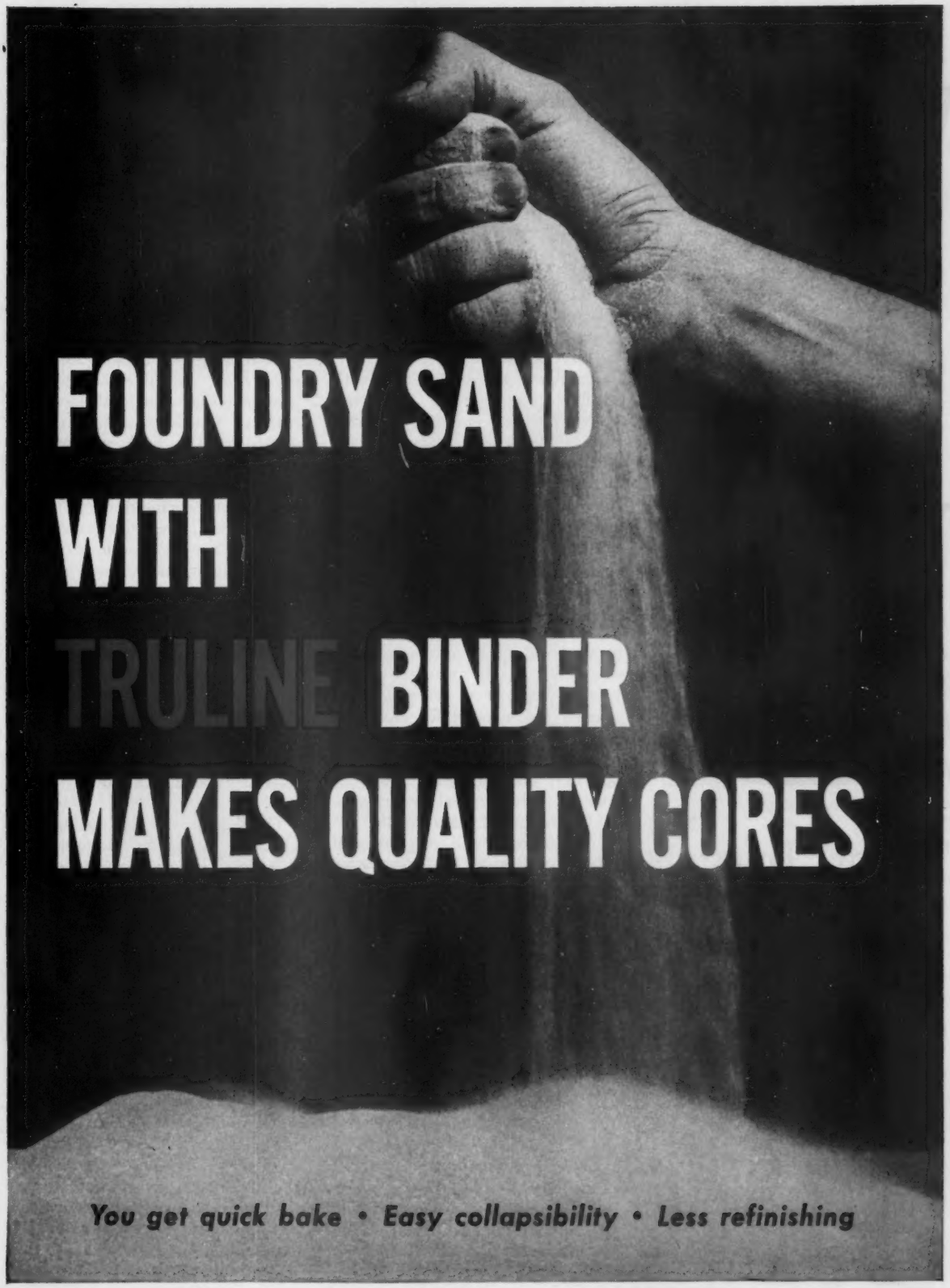
A very fast low cost machine that is setting new standards in the production of small shell cores. The quality of intricate shell cores is improved because sand is blown into core box cavities through unrestricted blow holes. A novel cradle-type core box clamp is used to invert the core box and at the same time bring the core box within easy reach of the operator for core removal. There is no out of balance weight to struggle with. The machine can handle core boxes up to 10″ x 10″ in size. Shell cores may weigh up to 4 lbs., before draining.

The HP-4 Redford has ample blow capacity and can also be used to blow Furfural resin sand mixes into heated core boxes.

Price F.O.B. Detroit—$1,200.00
For complete information write for Bulletin HP-4

. . Above cores illustrate the variety of work that can be done with the Redford HP-4 Core Blower.

REDFORD IRON & EQUIPMENT CO.
20733 Glendale - Detroit 23, Mich.
Phone: KEnwood 1-8611



Naval Stores Department
HERCULES POWDER COMPANY
INCORPORATED
Hercules Tower, 910 Market Street, Wilmington 99, Delaware

HF61-1

Flash Welded!

9/32" thru 2"

Taylor's Tougher

It's news! Taylor electrically flash welds ALL SIZES of TM Alloy Steel Chain! Every weld is positive, free of oxides and foreign materials. In addition, all TM Alloy Slings have patented Tayco Hooks—undergo rigid quality control, link-by-link inspection and scientific testing. These factors plus a signed Test Certificate assure maximum, trouble-free service and lower costs! Call your distributor or write direct for Bulletin 14-A today.

Chain is our specialty — not our sideline!

Taylor Made CHAIN SINCE 1873

S. G. TAYLOR CHAIN CO., Inc.
General Office: Hammond, Indiana
Plants: Hammond, Ind., and Pittsburgh, Pa.

For More Information Circle 563, Page 39

With the EDITORS

ACHIEVEMENT: Albion Malleable Iron Co., Albion, Mich., deserves much credit for the development of procedures that permit a pearlitic malleable iron 81-mm shell to be substituted for a forged shell (page 104). The development is significant to the Army, the company, the community and the foundry industry.

The Army gets a better shell with excellent fragmentation characteristics. The cost is lower. Because Albion and Sperry Products Corp. have developed a special ultrasonic inspection device, the Army can be sure that the man in the field gets ammunition that meets all specifications.

The company has diversified its market for pearlitic malleable and malleable castings, and has laid the groundwork for further expansion in the field of ammunition. The community has the assurance of continued employment to meet the recently placed order for shell. As further developments expand the market for shell of pearlitic malleable iron, other malleable foundries may be needed to meet the demand.

Our congratulations to the officers, directors, and employees of Albion Malleable for a valuable contribution to the nation and the industry.

Charges Included: A new idea in industrial show management has been announced by Clapp & Poliak, organizers of the Design Engineering show. Beginning with the 1962 show to be held in the McCormick Place Lakefront Exposition Center, Chicago, April 30 to May 3, the cost of installation, maintenance, and removal of exhibits will be furnished without charge beyond the announced rental fee.

Included among such services will be hauling exhibit material from the hall loading platform to booth and return after the show; uncrating and unpacking, erecting and dismantling of backgrounds and display units; positioning of equipment, machines, backgrounds and display units; electrical connections and normal wiring including current consumed; standard furniture, floor coverings, and booth backgrounds; and telephone installation and local calls.

Exhibit managers undoubtedy will be watching to see how the new arrangement works.

Ferrous Metals Book: Our sister publication, *Machine Design*, has just published and distributed to readers "The Ferrous Metals Book —1961." The book presents detailed data sheets to aid in proper selection and application of ferrous components, including gray irons, ductile irons, malleable irons, carbon steel, low-alloy steels, corrosion-resistant cast steels, and heat-resistant cast steels. The *Ferrous Metals Book* should be of considerable interest and benefit as a basic reference manual for design engineers. It also should be valuable for foundry sales engineers.

Copies of this book may be obtained from *Machine Design*, Penton Building, Cleveland 13, for $2 each, with discounts for quantities.

Quality: Buyers of castings are about the same the world over when it comes to demanding quality. A recent example of this is found in the report of the 1961 annual convention of the Institute of Indian Foundrymen which was held in Bombay. The following paragraph is from that report:

"While the foundry industry developed very well during the last year when the production of pig iron was at its peak, Sardar Swaran Singh (Union Minister for Steel, Mines and Fuel) pointed out that the emphasis had, however, changed to quality. Three or four years ago, the consumers were content to put up with rough castings whereas today, the consumers have become increasingly conscious of the quality and greater control over dimensional tolerances.

"The concept of raw materials is also changing greatly as product of one industry may eventually be a raw material for another industry.

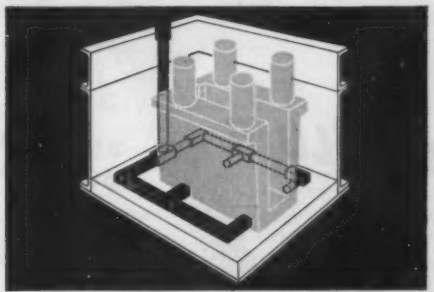
REFRACTORY GATE AND RUNNER TILE

AVAILABLE IN ROUND OR SQUARE SHAPES

Harbison-Walker Gate and Runner Tile are strong and withstand rapid metal flow without excessive erosion, assuring cleaner castings. Tile of minimum diameters may be used, with considerable reduction of metal in the gates, and consequent savings in scrap loss. Being much stronger than sand, the refractory tile permit pouring under high pressure, thereby reducing gas inclusions. • Installation in the mold is easier and faster, and overall cost is less. And the excellent workmanship of H-W Gate and Runner Tile accounts for their good tight fit. • More than 200 sizes and shapes are available, including cups or funnels, round and square tile with plain or jointed ends, crosses, tees and ells for complete gating systems. Many of the more popular sizes are available from stock. Write for catalog. • Harbison-Walker supplies refractories for other pouring equipment, including sleeves, nozzles and monolithic linings for foundry ladles.

Shapes for every need

Tight-fitting joints



A model arrangement . . . casting in phantom

HW 61-20

HARBISON-WALKER REFRACTORIES CO.

AND SUBSIDIARIES • GENERAL OFFICES: PITTSBURGH 22, PENNSYLVANIA

World's Most Complete Refractories Service

For More Information Circle 564, Page 39

clear the air for production

Dust produced by grinding, chipping and similar operations is removed as created by down draft dust control systems, pioneered by Kirk & Blum.

Whatever your problem in industrial dust control, call on Kirk & Blum, an organization of engineers and mechanics with 50 years' experience in this specialized field.

Write for complete information.
The Kirk & Blum Manufacturing Co.,
3108 Forrer Street, Cincinnati 9, Ohio

KIRK & BLUM DOWN DRAFT DUST CONTROL

As long as there is adequate basic raw materials available in our country, the Honorable Minister pointed out that there should not be any difficulty in reaching our ultimate goal of quality production."

Gray-Hot: Peter E. Rentschler of Hamilton Foundry Inc. sent along this clipping from a recent issue of the Waukegan (Ill.) *News-Sun*:

Gray-Hot Iron Used
For Branding Cattle

Fort Worth—Cattle are usually branded with a gray-hot iron. A red-hot iron produces too much burning and often results in sores which may become infected. Back in cattle-driving days, every cowboy carried a brand book listing the brands of local herds, reports of stolen cattle, and trail information.

A bit confusing for those who have other ideas concerning the association of the words gray and iron.

House in Order: Earlier in the year I presented an editorial pointing out that the foundry industry needs men who believe in the future.

As a result, one foundry friend wrote me as follows:

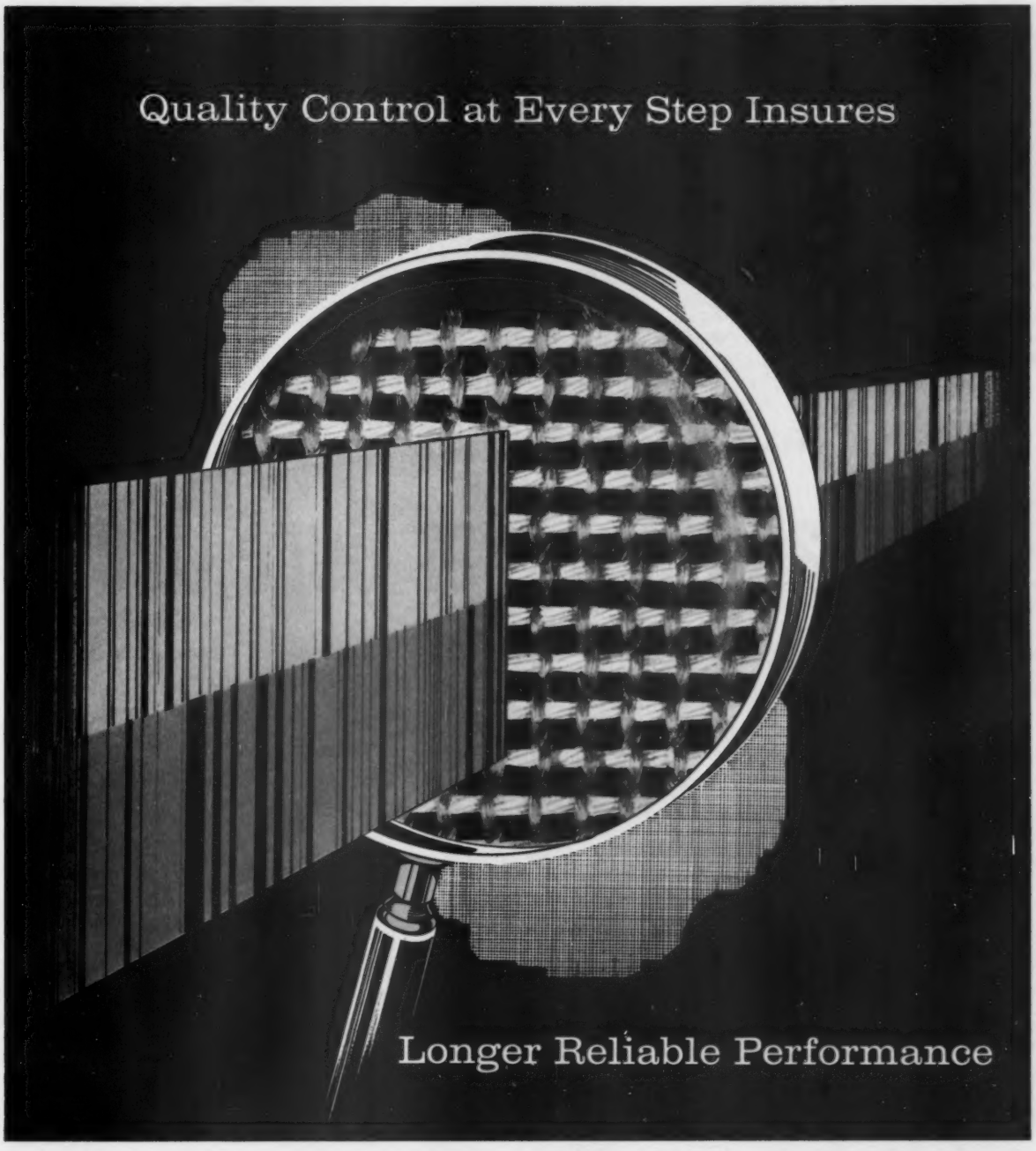
"Your editorial certainly is good advice to all those connected in any way with our industry. However, there is another subject (on which I know you have written many words over the years) which should be pounded home again and again. That is the subject of price cutting.

"It would seem that in addition to crying the blues when business is down, some also act as if the world was coming to an end and proceed to prove it to the casting buyer by offering to take reductions in their casting prices, or offering to lower prices below their competitors.

"This not only leaves them wide open to the unscrupulous casting buyer but also indicates a lack of confidence in their product and industry that eventually puts the CLOSED sign on their front doors.

"In nearly 50 years of foundry operating, I have learned that price cutting does not lead to a profitable operation. Neither is it necessary if all efforts are directed towards the producing of a quality product."

May I repeat again that the present world situation calls for all foundrymen to put their house in order. F.G.S.



NORTON REFRACTORY CEMENT

The quality of any high purity metal can only be as good as the quality of the refractory cement used to contain it. That's why Norton is producing cement that is uniformly quality controlled — *in each separate phase of its processing* — both physically and chemically.

Norton Refractory linings give more heats and closely predictable performance from lot to lot. The optimum density of Norton Cements gives them the mechanical strength to withstand the highest operating temperatures without spalling, slumping or otherwise failing — and to resist stresses imposed during charging, pouring and cleaning.

Norton engineers are prepared to formulate refractory cement to satisfy your individual metallurgical requirements. You'll get greater economy with Norton Cements because they retain their effectiveness longer and eliminate much of the patching required by grades of lower quality. Take advantage of this new idea in quality-controlled, custom-formulated cements that can help produce a better end product for you. For details on ALUNDUM* aluminum oxide, MAGNORITE* magnesium oxide, spinels and CRYSTOLON* silicon carbide cements, write today to NORTON COMPANY, Refractories Division, 308 New Bond Street, Worcester 6, Mass.

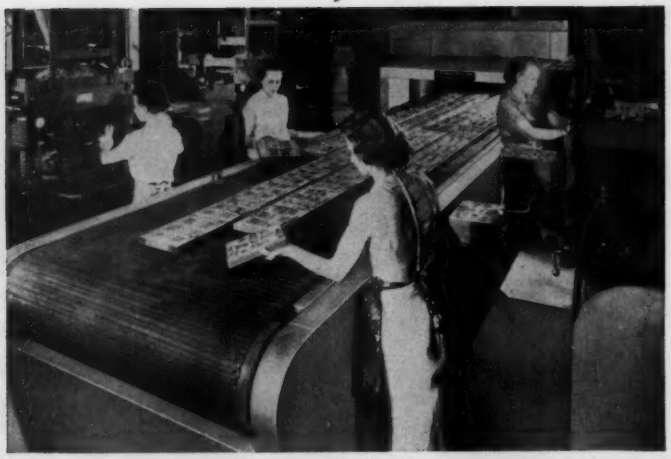
*Trade Marks Reg. U. S. Pat. Off. and Foreign Countries

NORTON
REFRACTORIES
Crystallizing ideas into products

For More Information Circle 566, Page 39

CUT LABOR COSTS

with



Coleman Dielectric Core Oven in leading plumbing fixture foundry. Direct labor alone reduced by 75%, with many other important savings and advantages.

Coleman Conveyor Core Ovens

Coleman Tower® Core Oven. One of two large installations in a major steel foundry. Mechanized handling and baking of cores up to 150 pounds at substantial annual savings.

● **Performance records in all types of foundries prove that Coleman Conveyor Core Ovens reduce core department costs by as much as 50%!**

Coleman Ovens quickly pay for themselves out of direct savings in labor, materials and reduced casting scrap.

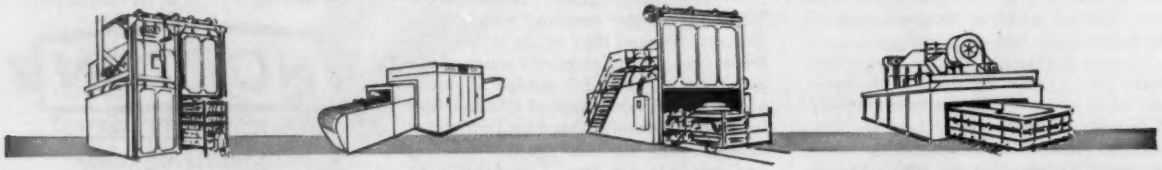
As builders of the world's only complete line of foundry ovens . . . dielectric or recirculating heat . . . we can recommend, without bias, the right oven for your particular needs.

WRITE FOR BULLETIN 54

THE FOUNDRY EQUIPMENT COMPANY • **1821 COLUMBUS ROAD, CLEVELAND 13, OHIO**

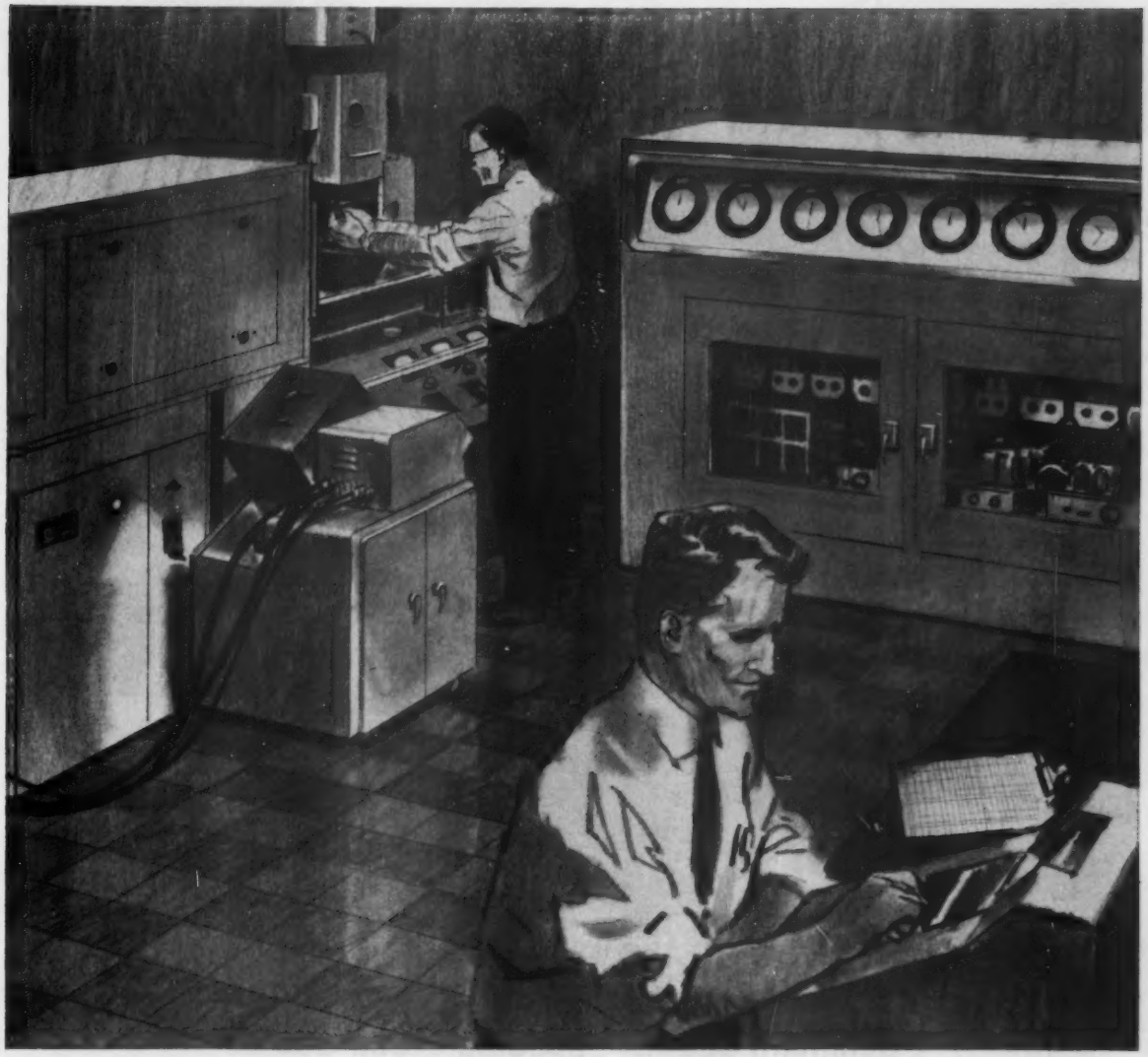
World's Oldest and Largest Foundry Oven Specialists—More than half a century of specialized foundry experience.

PART OF THE WORLD'S ONLY COMPLETE LINE OF FOUNDRY OVENS



TRANSRACK OVENS **DIELECTRIC CORE OVENS** **CAR TYPE OVENS** **JET ACTION MOLD OVENS**

Birth of a Gray Iron Casting—No. 5



QUALITY CONTROL . . .
NEVILLE PIG IRON AND FOUNDRY COKE

Quality controls exercised in the selection of ores and coals and carried into every step of production are the main reasons why Neville Pig Iron and Neville Foundry Coke have earned the highest reputation in the foundry industry.

Just recently a Research-Direct Reader Spectrograph was placed into operation. This instrument provides both production and quality control over the constituent elements in raw materials, assuring maximum quality in all grades of Neville Pig Iron.

In like manner, every carload of Neville Foundry Coke has been sampled and tested in our modern laboratories during production and prior to shipment. With this procedure Pittsburgh maintains the high standards of physical properties and chemical analysis so essential in the production of quality by-product foundry coke.

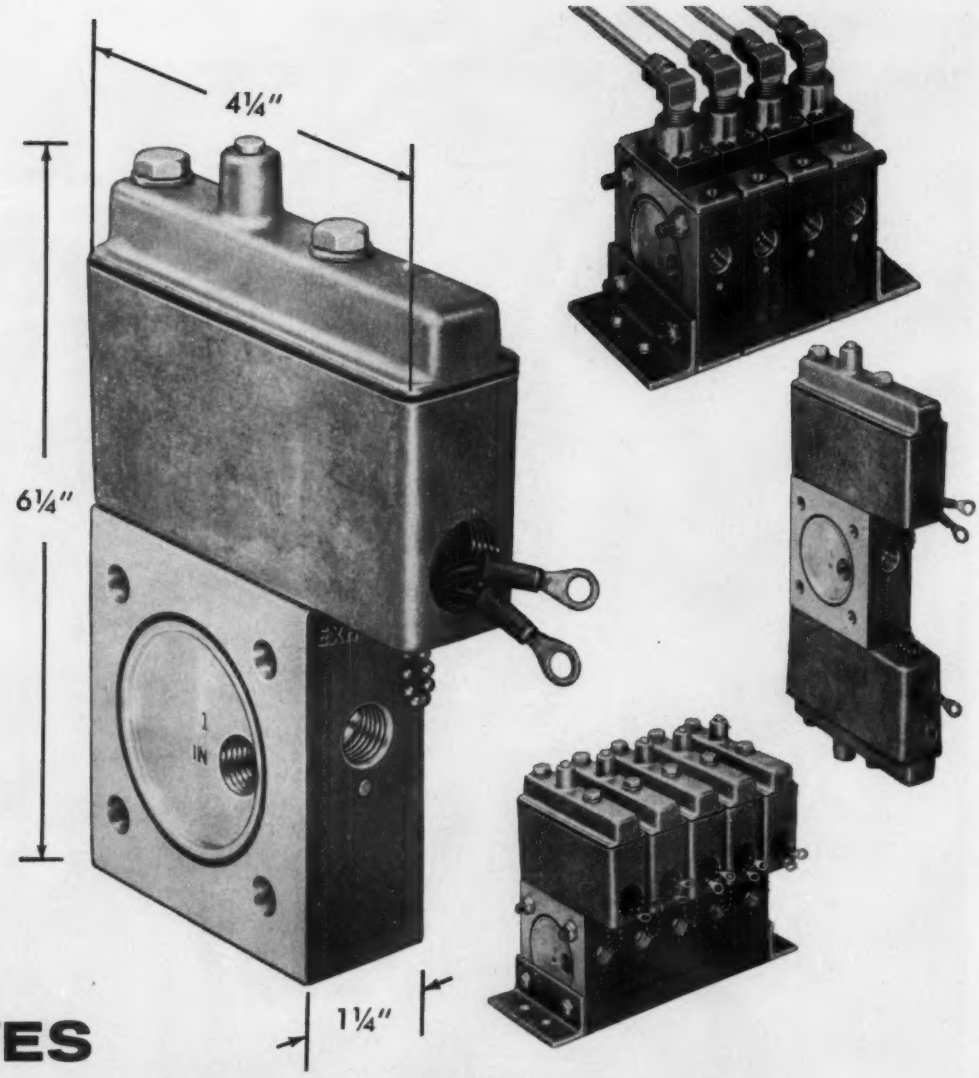
Select ores and coals, experience and competence, are the vital ingredients of Neville Foundry Coke and Neville Pig Iron . . . raw materials that aid the foundry in the production of superior gray iron castings.

COKE & IRON DIVISION
PITTSBURGH
COKE & CHEMICAL CO.
GRANT BUILDING PITTSBURGH 19, PA.

Neville Pig Iron and Neville Coke for the Foundry Trade

For More Information Circle 568, Page 39

SLIM LINE VALVES



• minimum space • building block design
• maximum control flexibility

Here's truly miniaturized, versatile precision control with surprisingly large flow capacity . . . Slim Line valves! Mount them singly to control clamping devices on jigs and fixtures. Or, bank them in manifolded groups of as many valves as you need, limited only by service and air requirements. Choose from 3- and 4-way types, for air, oil or water service, pressures to 125 psi, tapped ⅛ or ¼ in. NPT.

Where space is limited and you require maximum precision and versatility to control one or a virtually unlimited number of small or medium size cylinders, diaphragms, pilot cylinders, or similar devices . . . you need Slim Line valves. Ask your nearby Hunt representative for proof.

3048

For more information, write for Bulletin 612. Address Hunt Valve Co., Salem, Ohio, Dept. FO-961.

HUNT

QUICK-AS-WINK® AIR AND HYDRAULIC

VALVES

HUNT VALVE COMPANY • DIVISION OF IDEC • SALEM, OHIO

LATE NEWS

TREND IS UPWARD: Foundries didn't share in it, but industrial production reached a new high in July of 112 per cent of the 1957 average. The exception also was true of most segments of the metals industry, but the trend since then has been upward. Both steel mill and foundry operations improved in August. September and the fourth quarter should see production well above the July seasonally-influenced low level.

A big factor in this year's rise in output of goods and services has been the shift from business inventory liquidation to accumulation. Nevertheless, the National Association of Purchasing Agents reports that most buyers still cling to a conservative policy, since vigorous competition and abundant supply generally provide an atmosphere conducive to keeping the buyer in the driver's seat.

Price trends are mixed and devoid of the strength associated with past recoveries from recessions. Actually, the increase in output of goods and services has been sharp compared with those from the recessions of 1949, 1954, and 1958, but prices generally have not responded similarly.

DEFENSE: Although it's difficult to apportion exactly where increased defense expenditures will go, it appears likely that production of the following items will be stepped up: Motor vehicles, material handling equipment, machine tools, textile machinery, ground support equipment, construction equipment, electronics and communication equipment. Castings are an important part of most of these items.

Foundry Statistics

Iron and Steel Scrap Consumption

(Gross tons*)

	All Scrap Total	By Types of Furnace — Cupola Total	Air Total	Electric Total
1959	58,979,881	9,613,059	1,156,097	9,232,037
1960				
Apr.	5,605,919	754,486	32,767	787,186
4 mo. ..	25,751,980	3,239,420	382,646	3,830,597
May	5,051,121	771,800	79,170	852,585
June	4,485,444	809,297	87,485	633,797
July	3,678,127	603,062	55,974	520,361
Aug.	4,217,562	692,470	78,788	697,243
Sept.	4,148,550	732,252	76,939	641,712
Oct.	4,375,871	742,039	71,862	675,356
Nov.	3,939,970	709,187	70,282	607,471
Dec.	3,738,385	669,250	66,438	601,274
Total ...	50,387,010	8,968,777	989,584	8,850,396
1961				
Jan.	4,059,361	654,353	65,434	646,999
Feb.	3,925,802	593,810	61,286	642,853
Mar.	4,449,078	677,617	73,544	710,749
Apr.	4,665,842	675,271	76,073	725,994
4 mo. ..	17,100,083	2,601,051	270,337	2,626,595

Index of Foundry Equipment Orders

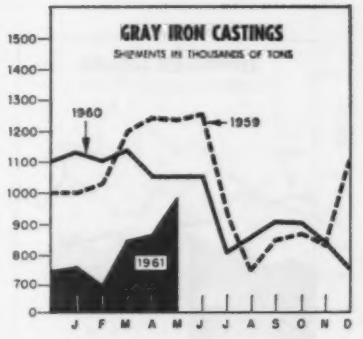
Foundry Trades Only

(Net Orders Closed, New Equipment)

	1960	1961
Jan.	95.5	123.7
Feb.	128.6	81.8
Mar.	159.9	99.1
Apr.	97.9	115.2
May	159.0	101.5
June	164.8	130.8
July	80.0	....
Aug.	92.4	....
Sept.	158.1	....
Oct.	81.7	....
Nov.	106.5	....
Dec.	101.2	....

Note: Base period 1947-49 taken as 100 per cent monthly average.

Source: Foundry Equipment Manufacturers Association.



GRAY IRON CASTINGS—SHIPMENTS

(Net tons[1])

	All Castings — Total	All Castings — For Sale	Miscellaneous Total	Castings For Sale	Nodular Iron Castings Total	Heavy Steel Ingot Molds Total	Chilled Railroad Car Wheels Total	Pressure Pipe & Fittings Total[2]	Soil Pipe & Fittings Total[2]	Unfilled Orders[2]
1959	12,307,798	6,994,200	7,451,925	3,247,389	173,433	2,142,498	209,945	1,440,883	862,547	.....
1960										
May	1,052,798	588,770	613,745	257,180	13,126	207,094	20,414	136,455	75,090	781,596
5 mo. ..	5,491,898	2,933,512	3,265,452	1,357,714	76,844	1,215,043	102,871	501,592	306,940	.....
June	1,049,638	601,597	622,236	273,148	15,010	183,049	19,810	144,773	79,770	719,564
July	803,306	456,580	478,269	202,347	10,694	120,784	16,226	120,652	67,375	754,789
Aug.	858,503	540,395	490,059	238,561	15,675	131,428	14,221	139,275	83,520	712,784
Sept.	900,497	527,227	554,788	245,887	14,616	125,888	13,460	135,327	71,234	695,325
Oct.	905,139	500,054	568,869	238,249	12,859	139,977	12,559	117,009	66,725	646,852
Nov.	835,709	454,611	538,817	230,022	11,870	123,054	12,410	102,959	58,469	568,974
Dec.	748,821	394,981	506,979	219,525	12,097	107,559	12,306	73,959	48,018	552,813
Totals ..	11,593,511	6,402,957	7,025,469	3,055,453	169,853[3]	2,246,582	203,863	1,335,546	782,051	.....
1961										
Jan.	760,136	406,315	504,182	222,508	11,874	123,277	11,847	69,881	50,949	599,776
Feb.	702,413	378,252	465,554	209,207	11,184	116,563	7,403	66,541	46,252	620,623
Mar.	856,491	496,928	509,932	232,384	12,193	155,545	9,090	110,792	71,132	651,696
Apr.	869,233	503,634	515,664	225,966	15,910	148,899	9,208	121,867	73,595	645,412
May	982,319	571,995	557,246	237,965	16,155	191,679	11,011	139,971	82,412	650,582
5 mo. ..	4,170,592	2,357,124	2,352,678	1,128,030	67,316	735,963	48,559	509,052	324,340	.....

Source: U. S. Dept. of Interior, Bureau of Mines. [1]Source: Bureau of the Census. [2]For sale only. [3]All cast iron pipe is shipped for sale. [4]Gray iron total includes nodular iron. [5]Monthly figures do not add up to total shown because of unreported monthly revisions.

Late News

GRAY IRON SURVEY: Gray Iron Founders' Society has contracted with Battelle Memorial Institute to conduct the first and fact-finding stage of a technical and economic survey of current and future uses for gray and ductile iron castings. Objective of the study is to determine how improved technology of production and use can be achieved and how such improved technology can increase cast iron consumption. The program will be financed by funds provided by 13 producers of merchant pig iron.

PLANTS AND PLANS: National Lead Co. has started production at its new diecasting plant at Boulogne, Argentina. Operated by its subsidiary, Doehler Argentina S. A., it will diecast aluminum, zinc, magnesium, and brass.

Bunting Brass & Bronze Co., Toledo, Ohio, has started modernization of its entire foundry. The work includes replacement of melting and molding equipment.

American Brake Shoe Co. has completed a $1 million expansion and improvement program at its Calera, Ala., foundry where it casts steel wheels for railroads.

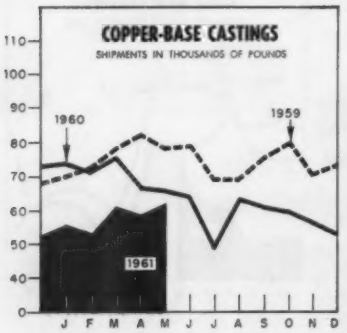
Arwood Corp. will open its sixth investment casting plant early in 1962 when it starts production at Cleveland in a building acquired last year from Alloy Precision Casting Co.

Wells Mfg. Co., Skokie, Ill., is building a 31,000-sq-ft addition to accommodate expanding production of gray iron and steel castings, principally in shell molds.

HIGHWAY CONSTRUCTION: Fiscal 1962 probably will not show an improvement over fiscal 1961 for highway construction equipment builders, owing to the delayed impact which the recently signed Federal-Aid Highway Act promises to have on increased levels of new construction projects. This is the prediction of the Machinery & Allied Products Institute, which also looks for start of a continuing improvement in equipment business in the summer of 1963.

JOINS BURNSIDE: George K. Dreher has resigned as market development director, Steel Founders' Society of America, effective Oct. 1, and will become director of marketing and development, Burnside Steel Foundry Co., Chicago.

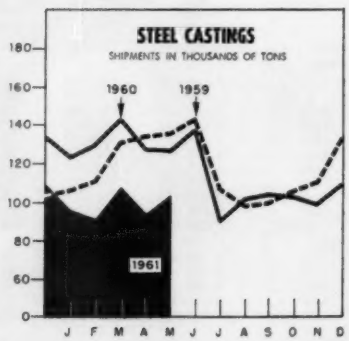
Foundry Statistics



COPPER-BASE CASTINGS

(Shipments of castings—1000 pounds[1])

	Shipments			
	Total	Sand	Perm. Mold	Unfilled Orders[2]
1959	871,032	765,246	52,456	.....
1960				
May	66,299	57,848	4,463	24,582
5 mo.	354,752	311,663	21,393	.....
June	64,585	56,441	3,715	21,781
July	48,399	42,778	2,910	22,367
Aug.	63,765	56,344	3,669	21,915
Sept.	61,362	54,104	3,699	21,063
Oct.	59,877	52,734	3,556	22,008
Nov.	56,358	50,043	3,132	21,281
Dec.	53,009	46,237	3,369	21,914
Total	762,107	670,344	45,443	.....
1961				
Jan.	55,878	48,928	3,286	22,792
Feb.	53,457	47,156	2,615	22,065
Mar.	61,252	53,277	3,414	20,965
Apr.	58,355	50,702	3,500	22,623
May	62,592	53,985	3,865	23,642
5 mo.	291,534	254,048	16,680	.....



STEEL CASTINGS—SHIPMENTS

(Net tons[1])

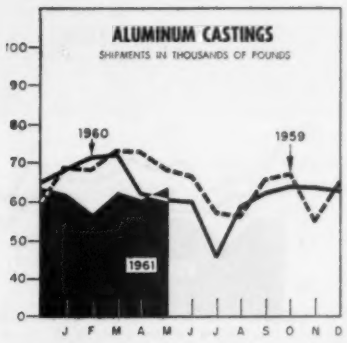
	All Castings			Carbon			Alloy			
	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	Unfilled Orders[2]
1959	1,412,885	1,112,668	210,984	1,043,538	814,219	194,201	369,347	308,449	16,783	.....
1960										
May	126,580	97,231	23,890	93,706	71,808	22,421	32,880	25,423	1,469	252,293
5 mo.	649,331	495,475	114,984	481,960	364,592	108,175	167,371	130,863	6,809	.....
June	136,922	107,076	26,389	101,294	78,601	24,707	35,698	28,475	1,682	233,765
July	89,565	67,294	13,430	63,753	47,570	12,804	25,812	19,724	626	223,880
Aug.	101,709	77,146	14,619	73,338	55,099	13,713	28,371	22,047	906	213,611
Sept.	104,298	79,556	14,171	74,447	56,126	13,273	29,851	23,430	898	199,413
Oct.	102,664	79,622	14,586	72,544	57,879	13,544	30,120	21,743	1,042	186,311
Nov.	99,577	78,305	15,768	69,927	56,466	14,113	29,650	21,839	1,655	174,317
Dec.	106,249	87,417	24,849	78,805	64,997	22,295	29,444	22,420	2,554	162,582
Totals	1,392,385	1,071,871	238,796	1,016,068	781,330	222,624	376,317	290,541	16,172	.....
1961										
Jan.	96,190	76,650	11,534	68,795	56,592	10,550	27,395	20,058	984	156,683
Feb.	92,602	71,907	9,128	64,849	51,209	7,818	27,753	20,698	1,310	145,024
Mar.	107,275	82,522	11,342	75,728	59,239	10,068	31,547	23,283	1,274	143,589
Apr.	93,978	71,027	5,414	65,844	49,763	4,381	28,134	21,264	1,033	147,234
May	103,205	79,485	8,966	73,860	57,246	7,950	29,345	22,239	1,016	157,354
5 mo.	493,250	381,591	46,384	349,076	274,049	40,767	144,174	107,542	5,617	.....

[1]Source: Bureau of the Census. [2]For sale only.

EQUIPMENT UP: Trend in demand for various types of equipment has been upward in recent months. June order index of the Foundry Equipment Manufacturers Association was 130.8, highest in nine months. June index of the Material Handling Institute was 175.5, best in five years. Industrial Heating Equipment Association reports July orders of members were 36 per cent ahead of last year.

PERSONALS: Alfred F. Bauer, since 1956 assistant general manager, Doehler-Jarvis Div., National Lead Co., has been appointed manager . . . Kenneth R. Daniel, recently vice president in charge of engineering and purchases, American Cast Iron Pipe Co., Birmingham, has been elected executive vice president . . . John Varga Jr. has been appointed chief engineer, Precision Castparts Corp., Portland, Oreg. He had been with Battelle Memorial Institute . . . A. E. Field, secretary, National Castings Co., Cleveland, also has been named a vice president . . . Thomas M. Colligan, recently with Peerless Foundry Co., Cincinnati, has joined the sales department of the H. P. Deuscher Co., Hamilton, Ohio . . . W. H. Majeske has been appointed general manager, Lewistown Foundry & Machine Co., Lewistown, Pa., succeeding the late J. W. Lequea . . . Charles Yoh, recently with National Castings Co., Cleveland, on Sept. 15 plans to join Gray Iron Founders' Society to work on the technical program for member foundries.

MISCELLANY: Look for announcement shortly of a new patented process for the production of nodular iron castings . . . Aluminum Co. of America plans to move its Detroit diecasting operations to Cleveland . . . July orders for new freight cars totaled 2452, against 1214 in June and 1306 a year ago . . . Lakey Foundry Co., Muskegon, Mich., is expected to step up its production of motor blocks for American Motors Corp., which is closing its Kenosha, Wis., foundry . . . July production of primary aluminum increased to 164,733 tons from 159,092 tons in June. It compares with 177,564 tons a year ago . . . Rockwell-Standard Corp. reports that its Aug. 1 backlog was the largest in 17 months . . . Voi-Shan Industries, Los Angeles, has acquired D-M-E Corp., Detroit, manufacturer of mold bases and moldmakers' supplies.



PRODUCTION WORKERS

Estimated Number

	May 1961	Apr. 1961	May 1960
Ferrous	172,800	167,700	188,800
Nonferrous	45,600	44,000	49,600

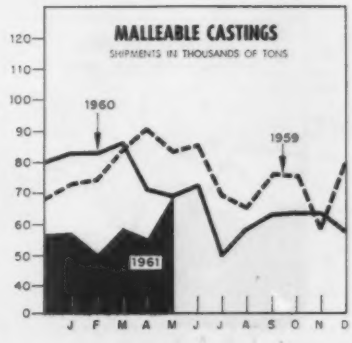
Average Weekly Earnings

Gray Iron	97.36	94.93	95.94
Malleable Iron	99.54	93.38	89.65
Steel	101.76	100.97	101.92
Nonferrous	102.54	103.31	101.50

Average Weekly Hours

Gray Iron	39.1	38.3	39.0
Malleable Iron	39.5	37.5	37.2
Steel	38.4	38.1	39.2
Nonferrous	39.9	40.2	40.6

Source: Bureau of Labor Statistics.



ALUMINUM CASTINGS

(Shipments of castings—1000 pounds[1])

	Shipments Total	Sand	Perm. Mold	Die	Unfilled Orders[2]
1959	786,399	141,987	274,855	368,101	.....
1960					
May	60,330	10,682	21,507	28,055	75,977
5 mo.	334,289	59,033	109,852	164,895	.....
June	60,068	11,280	20,953	27,722	74,699
July	45,694	8,765	15,804	20,973	76,434
Aug.	58,848	10,639	18,901	29,256	75,230
Sept.	62,116	10,514	22,031	29,527	75,144
Oct.	63,759	10,149	23,339	30,213	71,364
Nov.	63,408	9,961	23,612	29,831	73,032
Dec.	63,629	9,578	23,272	30,677	71,398
Total	751,802	129,859	257,764	363,094	.....
1961					
Jan.	60,774	10,210	21,821	29,904	63,729
Feb.	57,144	10,183	19,518	27,355	62,748
Mar.	62,518	10,715	21,454	30,246	62,883
Apr.	60,253	10,037	21,065	29,096	65,316
May	63,680	9,945	23,484	30,167	69,110
5 mo.	304,369	51,090	107,342	146,768	.....

[1]Source: Bureau of the Census. [2]For sale only.

MALLEABLE IRON CASTINGS

(Shipments of castings—net tons[1])

	Shipments Total	For Sale	Standard Total	For Sale	Pearlitic Total	For Sale	Unfilled Orders[2]
1959	916,362	557,303	729,868	449,946	186,494	107,357	.....
1960							
May	68,942	37,618	53,108	30,126	15,834	7,492	73,240
5 mo.	392,762	219,588	304,460	175,938	88,302	43,650	.....
June	72,593	43,105	55,956	34,526	16,637	8,579	63,920
July	49,860	28,575	37,187	22,477	12,673	6,098	74,329
Aug.	58,785	36,765	46,522	29,077	12,263	7,688	69,853
Sept.	63,048	36,114	48,635	28,623	14,413	7,491	69,033
Oct.	63,521	35,492	47,932	27,813	15,589	7,679	56,616
Nov.	62,978	35,432	47,571	27,611	15,407	7,821	55,627
Dec.	57,154	31,500	43,319	24,729	13,835	6,771	54,657
Totals	820,701	466,571	631,582	370,794	189,119	95,777	.....
1961							
Jan.	57,697	34,064	43,778	27,104	13,919	6,960	52,171
Feb.	50,828	29,675	39,258	23,854	11,470	5,821	47,703
Mar.	58,464	33,531	45,747	26,711	12,717	6,820	45,477
Apr.	55,590	31,436	43,192	25,152	12,398	6,284	48,098
May	68,406	40,270	52,637	32,197	15,769	8,073	51,894
5 mo.	290,985	168,976	224,712	135,018	66,273	33,958	.....

Prices of Foundry Metals and Coke

(As of August 25, 1961)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE

Connellsville	$18.00-$18.50

OVENS

Birmingham	$30.35
Buffalo	32.00
Detroit	32.00
Erie, Pa.	32.00
Indianapolis	31.25
Kearny, N. J.	31.25
Milwaukee	32.00
Neville Island (Pittsburgh)	30.75
New Haven, Conn.	31.00
Painesville, O.	32.00
Philadelphia	31.00
St. Louis	33.00
St. Paul	31.25
Swedeland, Pa.	31.00
Terre Haute, Ind.	31.25

PIG IRON

(Per gross ton, f.o.b. furnace)

	No. 2 Foundry	Malleable
Birdsboro, Pa.	$68.50	$69.00
Birmingham	62.50	66.50
Boston, deld.	77.79	78.29
Buffalo	66.50	67.00
Chester, Pa.	Nom.	Nom.
Chicago	66.50	66.50
Cleveland	66.50	66.50
Duluth	66.50	66.50
Erie, Pa.	66.50	66.50
Fontana, Calif.	75.50	....
Geneva, Utah	66.50	....
Granite City, Ill.	68.40	68.90
Neville Island (Pittsburgh)	66.50	66.50
Swedeland, Pa.	68.50	69.00
Toledo, O.	66.50	66.50
Troy, O.	68.50	69.00
Youngstown, O.	....	66.50

NONFERROUS INGOT

(Cents per pound, carlots)

BRASS AND BRONZE: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high-leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

ALUMINUM: Primary alloy No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80; secondary No. 12 alloy, 21.75-22.25. Deoxidizing grades: No. 1, 23.25; No. 4, 20.00.

MAGNESIUM ALLOY: AZ91A, 40.75; AZ63A, AZ92A, AZ91C, 40.75, f.o.b. Velasco, Tex.

COPPER: Electrolytic 31.00, delivered Connecticut valley.

ZINC: High grade, 12.35, delivered. Die casting alloy No. 3, 13.75; No. 2, 14.25, delivered.

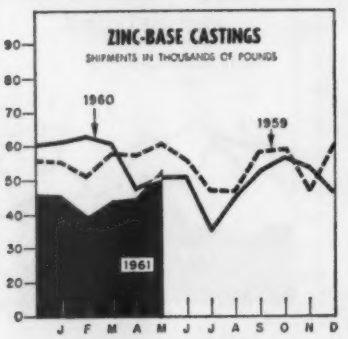
Iron and Steel Scrap

(Consumer prices per gross ton delivered, except as otherwise noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Machinery Cast	Structurals, Plates	Malleable	Short Steel Rails
Birmingham	$37.00-38.00	$42.00-43.00	.....	.....	$42.00-43.00	.....	$46.00-47.00
Boston*	**28.50-29.00	**39.00-40.00	.....	**40.00-42.00	.....	.....	.....
Buffalo	31.00-32.00	**37.00-38.00	.....	**44.00-45.00	39.00-40.00	.....	48.00-49.00
Chicago	40.00-41.00	42.00-43.00	.....	47.00-48.00	44.00-45.00	47.00-48.00	49.00-51.00
Cincinnati*	**33.00-34.00	**34.00-35.00	**28.00-29.00	**46.00-47.00	.....	.....	**47.00-48.00
Cleveland	36.00-37.00	39.00-40.00	28.00-29.00	48.00-49.00	41.00-42.00	48.00-49.00	49.00-51.00
Detroit*	32.00-33.00	32.00-33.00	26.00-27.00	26.00-27.00	.....	.....	.....
Los Angeles	40.00-41.00	44.00-46.00	.....	.....	.....	.....	.....
New York*	30.00-31.00	34.00-35.00	31.00-32.00	.....	34.00-35.00	.....	.....
Philadelphia	40.00	40.00	40.00	49.00-50.00	44.00-46.00	49.00	.....
Pittsburgh	35.00-36.00	**34.00-35.00	.....	**45.00-46.00	39.00-43.00	.....	50.00-52.00
St. Louis*	35.00	37.00	32.00	.....	.....	.....	44.00
San Francisco	43.00	46.00	28.00	45.00-46.00	.....	.....	.....
Seattle	46.00	41.00	38.00	.....	.....	.....	.....

*Brokers' buying prices. **F.o.b. shipping point.

Foundry Statistics



ZINC-BASE CASTINGS

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1959	631,210	443,009	.....
1960			
May	50,844	33,551	56,654
5 mo.	293,735	186,458	.....
June	50,809	34,264	51,960
July	35,117	25,186	52,392
Aug.	45,101	32,549	57,551
Sept.	52,514	34,451	57,480
Oct.	56,205	36,459	57,025
Nov.	53,574	33,758	55,306
Dec.	46,208	29,341	51,516
Totals	623,203	412,466	.....
1961			
Jan.	46,011	30,311	50,940
Feb.	39,946	26,715	45,453
Mar.	44,130	29,724	43,921
Apr.	44,853	30,225	47,853
May	52,604	34,442	50,054
5 mo.	227,544	151,417	.....

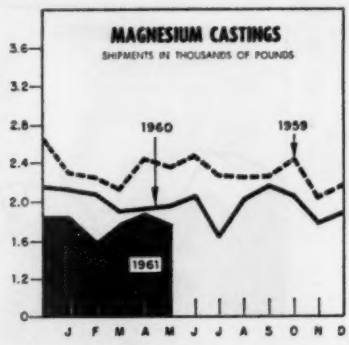
PIG IRON

PRODUCTION**—Net Tons

	Foundry	Malleable & Silvery	Low & Int. Low Phos. & Bessemer
1959	1,889,445	2,810,359	3,471,683
1960			
June	105,717	247,991	309,942
6 mo.	778,878	1,793,699	2,460,084
July	117,218	166,084	290,384
Aug.	78,950	171,718	211,506
Sept.	93,260	202,895	152,880
Oct.	133,525	183,639	208,758
Nov.	122,550	231,203	206,062
Dec.	130,455	153,009	202,353
Totals	1,454,836	2,902,247	3,732,027
1961			
Jan.	106,054	165,571	170,224
Feb.	98,207	144,476	214,396
Mar.	101,306	159,529	222,688
Apr.	114,050	150,322	189,779
May	118,211	166,365	215,093
June	97,060	186,127	240,287
6 mo.	636,424	972,391	1,252,467

CONSUMPTION*—Gross Tons

	Cupola	Air	Electric
1959	3,989,129	223,868	351,355
1960			
Apr.	282,178	16,796	36,971
4 mo.	1,249,000	75,729	169,749
May	292,407	15,730	19,869
June	313,340	16,828	23,720
July	241,752	11,892	21,123
Aug.	273,722	14,697	27,919
Sept.	284,809	13,543	19,962
Oct.	269,103	13,631	13,947
Nov.	254,799	12,867	17,567
Dec.	233,592	12,722	18,344
Totals	3,412,524	187,644	331,200
1961			
Jan.	232,051	13,293	16,375
Feb.	225,222	12,195	21,705
Mar.	251,524	13,922	18,646
Apr.	242,415	12,208	20,412
4 mo.	951,212	51,618	77,138



MAGNESIUM CASTINGS

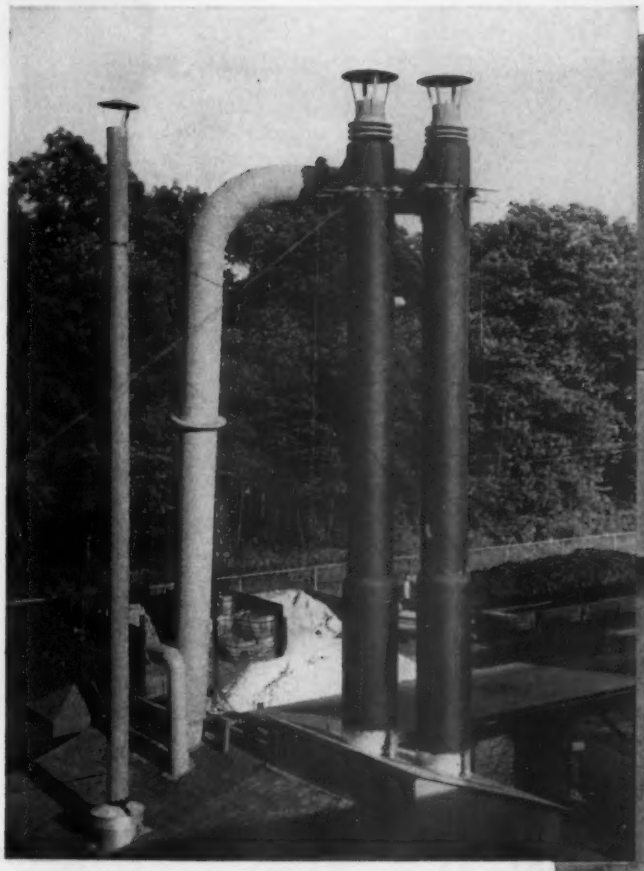
(Shipments of castings—1000 pounds[1])

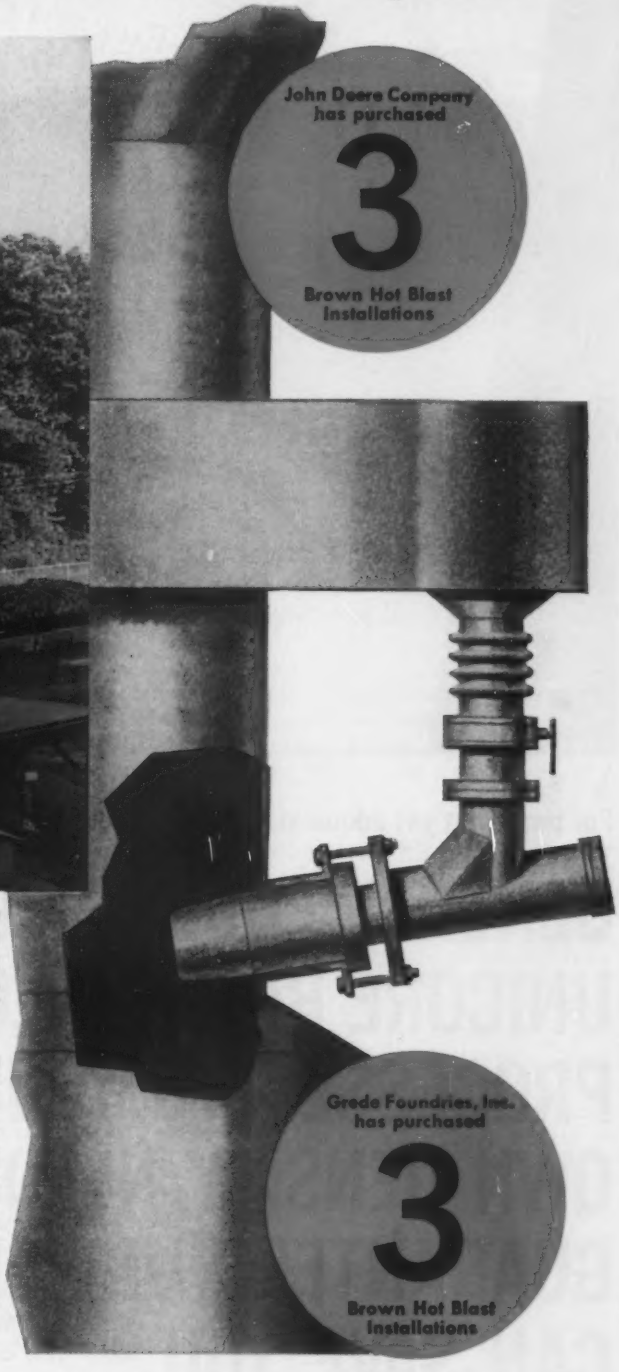
	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1959	27,253	23,109	.....
1960			
May	1,953	1,514	2,948
5 mo.	9,992	7,838	.....
June	2,050	1,555	3,396
July	1,638	1,234	3,541
Aug.	2,025	1,530	3,364
Sept.	2,146	1,653	3,271
Oct.	2,038	1,519	3,274
Nov.	1,776	1,269	3,433
Dec.	1,875	1,345	3,156
Total	23,540	17,943	.....
1961			
Jan.	1,862	1,436	2,847
Feb.	1,610	1,206	2,770
Mar.	1,791	1,360	2,476
Apr.	1,809	1,439	2,888
May	1,764	1,338	2,910
5 mo.	8,836	6,779	.....

*Source: U. S. Dept. of Interior, Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For Sale only. [3]Monthly figures may not add up to totals shown because of unreported monthly revisions.

A PROFIT-WINNING COMBINATION

Hot Blast and Water-Cooled Cupolas





Reduce your foundry's melting costs with the combination of Brown water-cooled cupolas and hot blast systems! The profits you make by using less coke, alloys, and pig iron pay off an installation quickly—*afterwards earning thousands of dollars a year for you.*

Leading consultants rank water-cooled cupolas and hot blast as perhaps the main way a foundry can decrease costs while improving quality today. We have examples where supplying preheated air paid off the initial investment in less than 12 months. The modular construction of Brown units makes it possible for even small foundries to capitalize on the combination of water-cooled cupolas and hot blast! Write for a survey, without obligation, of your needs today.

FREE HOT BLAST BULLETIN—Gives the full story on Brown Hot Blast savings. Write for Bulletin 2000.

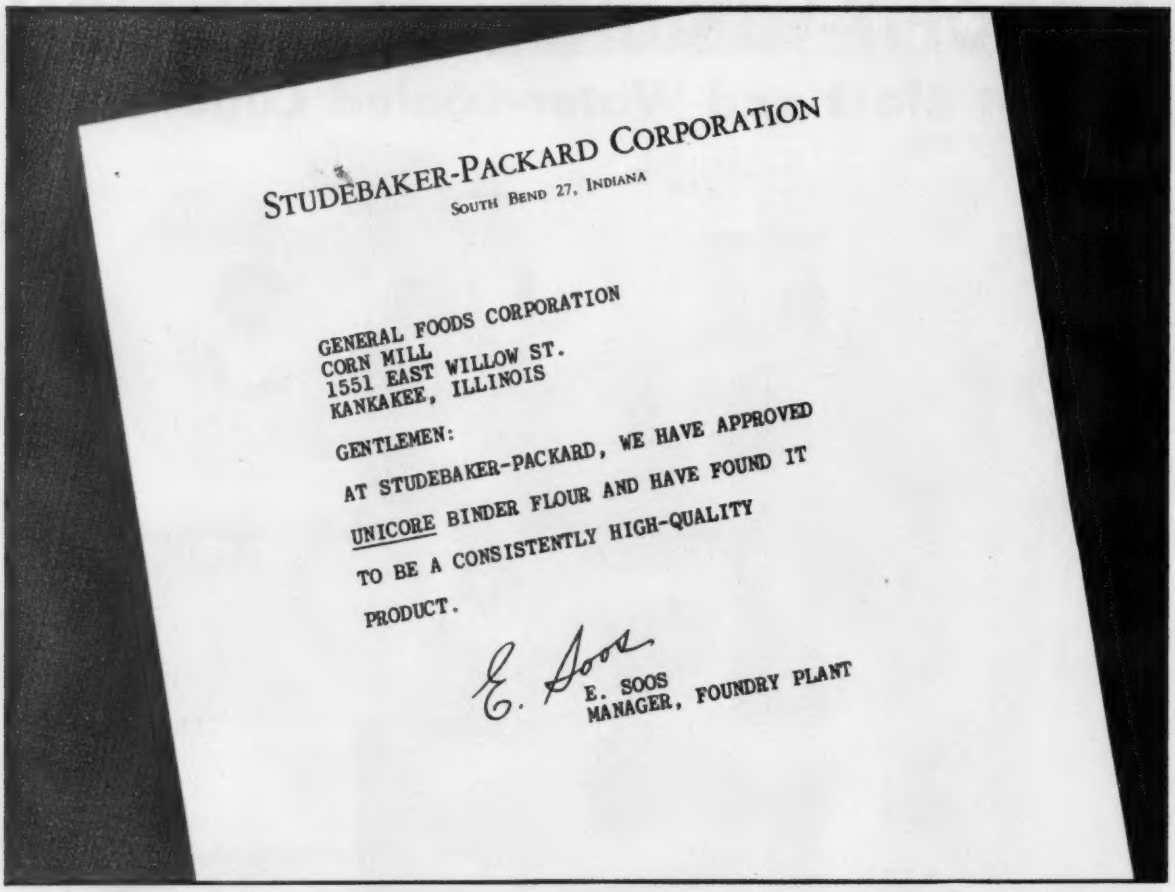
BROWN METALS INCORPORATED

Subsidiary of Brown Fintube Company

300 HURON STREET, ELYRIA, OHIO • TELEPHONE FAirfax 3-3291

Fintube Hot Blast Heaters • Water-Cooled Cupolas • Mechanical Chargers • Induction Furnaces
Engineering Service • Hot Metal Holding and Transfer Units • Yard Layout and Storage
Representatives In All Principal Cities

For More Information Circle 570, Page 39



For those not yet acquainted with UNICORE, General Foods repeats its introductory pledge:

GENERAL FOODS' NEW UNICORE BINDER FLOUR . . . PROCESSED TO YOUR OWN DENSITY NEEDS . . . GUARANTEED UNIFORMITY . . . CAN SAVE YOU 20% IN BINDER COSTS!

G.F.'s new UNICORE process is an advanced technical development in the production of foundry binder flour. Rigid control now permits you to choose the binder density • —ranging from 425 to 600 grams—that suits your operation best. Some foundries have actually discovered they can reduce the usage level of UNICORE and save up to 20% in binder costs while maintaining their high-quality standards. The difference is the new UNICORE process which develops unusual physical properties in addition to those measurable by standard lab tests. You can prove UNICORE's quality in your core room. Send for a free sample today: General Foods Corn Mill, 1551 E. Willow St., Kankakee, Ill.

Non-Ferrous Founders Plan Annual Meeting in September

Non-Ferrous Founders' Society will hold its annual meeting at Shawnee Inn., Shawnee-on-Delaware, Pa., Sept. 18-20. Four sessions on various phases of marketing will feature the following speakers:

Frank G. Steinebach, FOUNDRY; John E. Graf, Mansfield Brass & Aluminum Corp., Mansfield, Ohio; Dr. R. A. Flinn, NFFS technical consultant; and H. G. Teracks, GMC Truck & Coach Div. Banquet speaker is Dr. Cleo Dawson, Lexington, Ky., psychologist and lecturer.

The Cast Bronze Bearing Institute, a product group of NFFS, will hold its annual meeting at Shawnee Inn, Sept. 20-21.

Program details follow:

Monday, Sept. 18

9:00 a.m.—"Cost Trends and Profit Evaluation," John E. Graf, treasurer, Mansfield Brass & Aluminum Corp., Mansfield, Ohio.
10:35 a.m.—"How to Help Your Customers Specify Casting Alloys," Dr. R. A. Flinn, NFFS Technical Consultant, Ann Arbor, Mich.
2:00 p.m.—Management group conference.
8:00 p.m.—Meeting of executive committee.

Tuesday, Sept. 19

9:00 a.m.—Meeting of NFFS 1960-61 board; golf tournament.
6:30 p.m.—Reception and barbeque.

Wednesday, Sept. 20

9:00 a.m.—"Selection and Quality Requirequirements of Nonferrous Castings for GMC Trucks and Coaches," H. G. Teracks, chief metallurgist and head, Engineering Laboratories, GMC Truck & Coach Div.
10:35 a.m.—"Nonferrous Castings Clinics—New Sales Aid for Members," Dan A. Mitchell, vice president of sales, Progressive Brass Mfg. Co., Tulsa, Okla.
12:30 p.m.—Luncheon and annual business meeting. "The Nonferrous Castings Market," Frank G. Steinebach, publisher and editorial director, FOUNDRY.
2:30 p.m.—Meeting of NFFS 1961-62 board; meeting of 1961-62 executive committee.
6:30 p.m.—Reception and annual banquet.—"How to Manage a Woman," Dr. Cleo Dawson, Lexington, Ky.

Develops Injection Method For Producing Ductile Iron

Jamestown Malleable Iron Div., Blackstone Corp., Jamestown, N. Y., has developed a process for injecting pure magnesium into molten iron for production of nodular or ductile iron. According to the firm, the method possesses advantages over the plunging method used with magnesium-bearing alloys. In addition, it is said that the process may be used in producing grade A quality malleable iron meeting ASTM requirements.

New V-8 Has Light Iron Castings

Worker takes a sample of molten iron from transfer ladle in front of one of three new, water-cooled cupolas recently installed at Ford Cleveland Foundry

● GRAY IRON castings production for Ford's new compact V-8 engine is well under way at the Ford Cleveland Foundry. The engine has 221 cu in. displacement and develops about 145 hp. The block is of the short skirted type, a feature also employed in the Falcon block.

The engine is available as optional equipment for Ford's new compact car, the Fairlane. In all probability, the engine also will be available in other Ford cars.

The castings for the new engine are an approach to the "thin wall" variety on which all automotive manufacturers are working, and effort has been expended through modern casting design techniques to minimize weight while retaining adequate strength. Much of the ability to do that depends on the production of castings with high fidelity to the pattern, smooth surface finish, and close dimensional tolerance.

This is being done at the Ford Cleveland Foundry through the use of high-hardness molds, wear-resistant alloy cast iron patterns, and furan-urea formaldehyde-bonded cores produced in hot boxes.

High Pressure Molding — Green sand molding machines in the foundry have been equipped with boosters to raise air pressure to 140 psi. Molds now are produced to a hardness of 95-100 as compared with a hardness of 85-90 achieved with the previously used air line pressure of 90-95 psi.

All cores used in producing the block, head, and intake and exhaust manifold castings, except crankcase cores for the block, are of sand bonded with furan-urea formaldehyde resin. They are being produced on new coreblowing machines designed to handle the wet resin core sand mixes, using the hot-box method. Coreboxes are of alloy cast iron, measuring 27 x 36 in. and operated at 450-475° F.

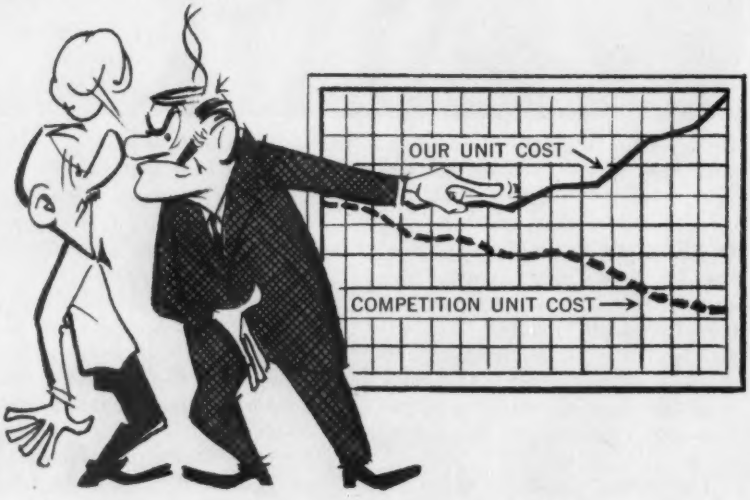
Cores are loaded on conveyors for movement to the cleaning and assembly area prior to delivery to the molding area.

New Cupolas—Three new cupolas have been installed, replacing six of the acid-lined cupolas which were original equipment in 1952. The new, water jacketed cupolas are unlined except for carbon block in the well. Blast air is heated externally, using natural gas as a fuel. Each cupola produces about 35 tons

(*Concluded on Page 26*)

IT'S A FACT...BUSINESS FAILURES DURING 1961 WILL BE AS HIGH AS NEW-BUSINESS-STARTS! THIS PHENOMENON INDICATES THE PRESENCE OF A NEW COMPETITIVE TWIST IN OUR RISING ECONOMY!

SURVIVAL



● SURVIVE! . . . is the basic command issued by the stock holders of a great many metalworking organizations. This is especially true in the *foundry industry* . . . because competition here is reaching an all-time high. It is the product of the foundry that signals "first costs" and these costs receive management's maximum scrutiny.

The problems involving SURVIVAL in the foundry industry are more complex each day . . . but it should be pointed out immediately that there are solutions to most of these "death dealing" factors. If your company can produce a product unit (of specified quality and quantity) at a competitive price and you are in trouble, your problems are probably related to sales ability.

If you find it difficult (or impossible) to match price . . . your problems concern operating costs, and these reflect production ability as well as administrative overhead. (Remember . . . the overhead burden attached to each product unit can be reduced by means of increased production . . . production that is fast and economical.)

Let's deal, at this time, with a foundry that cannot beat the competition's price and delivery schedule. It is a cruel fact . . . such a company won't last long even in a prosperous economy. Now let's examine the production facilities of this organization. If the equipment is seven or more years old . . . no matter how well it has been maintained . . . the production ability of this foundry is economically obsolete!

Fast and economical production (together with a well trained sales force) will generally provide the hard-hit foundry with stimulus and profits. Rebuilt machinery may be brought back to original "ability", but these machines are still no match for the newer semi and fully automatic equipment that is establishing new *highs* in production and new *lows* in cost.

And so SURVIVAL in PROSPERITY is a new experience for most business men. The large continue to grow . . . and the small will grow smaller UNLESS THEY MEET THE COMPETITIVE CHALLENGE with a re-gearing of production facilities and sales impact.

NOW! . . . is the time to channel your thinking in the direction of *grow!* NOW! . . . is the time to invest in new high-speed equipment that will make you the *"competitor-to-be-watched."*

NOW! . . . is the time to re-examine the *high-cost of short-range economies* and to look at the advantages to be gained through *modern equipment!*

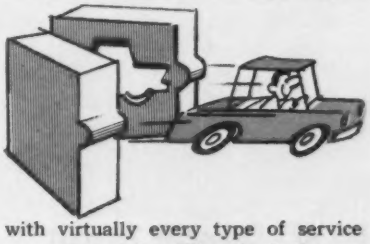
Consider these important facts. Our population is growing . . . growing at

in PROSPERITY!

an unprecedented rate. This will mean more products of every conceivable type. What's more, additional product components are being changed to cast-production. (Recent news stories indicate that several automotive manufacturers have scheduled connecting rods, crank shafts and cam shafts for foundry production.) Your potential is greater today than ever before. Be sure that your company becomes a working part of our economy in the decade ahead and not a monument dedicated to today's errors of judgment.

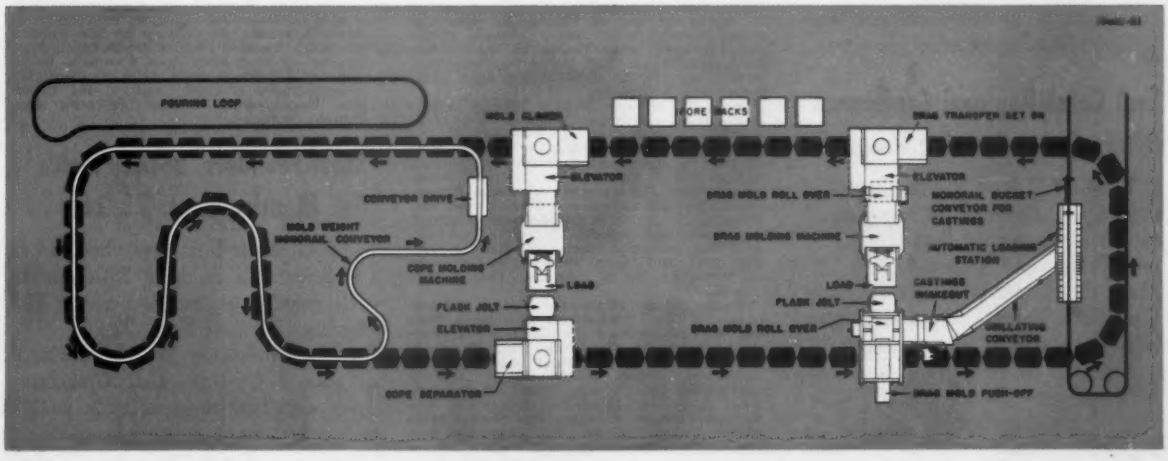
If your move now is for modern equipment, remember that old buying habits, like old machines, can cost you your chances of survival. We urge you to investigate the production engineered equipment being created by SPO, Inc. (The diagram below shows a newly installed automated foundry designed and installed by SPO's creative engineers.)

Today, SPO is the world's leading supplier of foundry molding machines and ancillary equipment. Our research and design facilities are second to none, and our field engineers stand ready to provide your organization



with virtually every type of service you may require. We will gladly provide you with technical information and offer our suggestions and you will be under no obligation. May we suggest you contact SPO.

SPO INCORPORATED
6449 Grand Division Avenue,
Cleveland 25, Ohio, U.S.A.
Call Diamond 1-3666.



(*Concluded from Page 23*)

of molten iron an hour.

The three new, 90-ft-high cupolas are expected to increase melting capacity of the foundry by 10 per cent and to reduce production costs substantially.

The cupolas currently are equipped with electrostatic precipitators to reduce air contaminant emission. Plans have been formulated to augment the emission control equipment in line with the foundry's present program of modernizing the air pollution control system at the plant.

A new bag collector system handles exhaust air from blast cleaning units, shakeouts, and other cleaning room areas at the rate of 650,000 cfm. In efficiency it more than exceeds Ford's specification of no more than 0.005 grain of contaminant per cubic foot of exhaust air. It far exceeds the local code requirement of not more than 0.3 grain per cubic foot of exhaust air. No visible effluent comes from the stacks of the bag house.

Big AFS Exposition Forecast

Exhibit space has been assigned by the American Foundrymen's Society to 125 exhibitors for the Castings Congress and Exposition to be held in Detroit, May 7-11. These assignments were made four months ahead of the usual time, and AFS reports that the early demand for exhibit space indicates that the 1962 exposition will exceed in size any previous foundry show.

East Coast Regional Conference Offers Comprehensive Program

The 1961 East Coast Regional Foundry Conference of the American Foundrymen's Society, to be held Friday and Saturday, Sept. 22-23, at the Statler Hilton Hotel, New York, will feature "New Horizons in Metal Casting" as its theme.

A partial list of speakers and subjects follows:

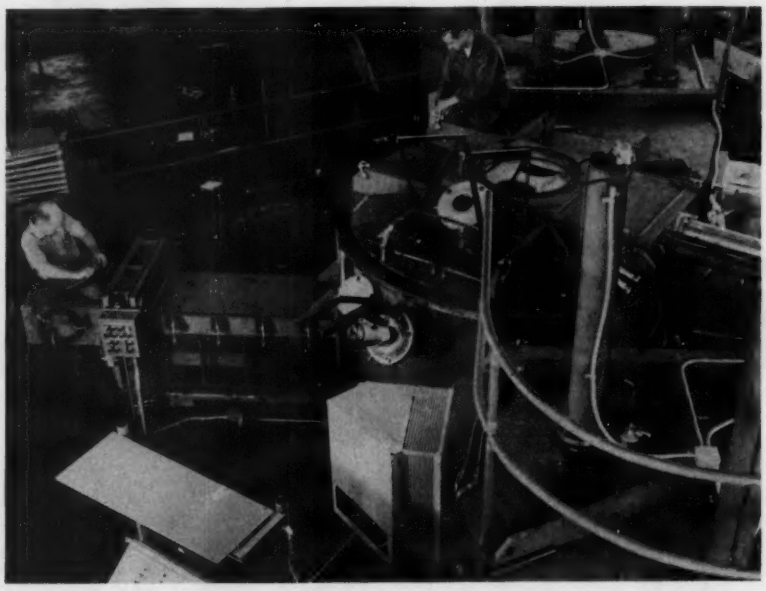
Gray Iron and Ductile Iron—**Education and Management Improvement in the Foundry,** H. F. Taylor, Massachusetts Institute of Technology, Cambridge; **Engineering Properties of the Various Cast Irons,** V. H. Patterson; Vanadium Corp. of America, Chicago; **Influence of Inoculation on the Structure of Gray Cast Iron at Various Equivalences,** Harish D. Merchant, Owens Illinois Technical Center, Toledo, Ohio; **Post Inoculation of Ductile Iron,** W. C. Jeffrey, McWane Cast Iron Pump Co., Birmingham; **Progress of Solidification in Inoculated and Uninoculated Gray Iron,** Harish D. Merchant; **Use of Calcium in Acid Cupolas,** Ralph Clark, Union Carbide Metals Co., Cleveland; **Shop Course on Ductile Iron Production,** Harold Ruf, Grede Foundries Inc., Milwaukee, and E. A. Welander, John Deere & Co., East Moline, Ill.

Brass and Bronze—**Use of Wetting Agents in the Brass and Bronze Foundry,** William N. Richards, Deynor Corp., Mamaroneck, N. Y.; **Round Grain Carbon-Sand—A New Molding Medium for Brass and Bronze,** E. G. Gentry, Humble Oil & Refining Co., Detroit; **Superston, a New High-Strength Aluminum Bronze,** Frank Herlihy, American Brake Shoe Co., Mahwah, N. J.; **New Developments in Melting Brass and Bronze,** Harley F. Gauker, Ajax Magnethermic Corp., Trenton, N. J.; **AFS Brass and Bronze Research at University of Michigan,** R. W. Ruddle, Foseco Inc., Cleveland.

Aluminum and Magnesium—**Latest Developments in Core Binders for Aluminum Sand and Permanent Mold Castings,** R. M. Ovestrud, Reichhold Chemicals Inc., Elizabeth, N. J.; **Present Day Melting Equipment for Nonferrous Metals,** R. P. Dunn, Lindberg Engineering Co., Chicago. There will be additional talks on **Degassing Aluminum with Nitrogen-Chlorine Mixtures, The Newest Magnesium Casting Alloys,** and **Aluminum Permanent Mold Practice.**

Malleable Iron—**Pearlitic Malleable Iron and Its Applications,** Prof. Richard Schneidewind, University of Michigan; **Laboratory Controls in a Malleable Shop,** Gordon Mannweiler, Eastern Co., Naugatuck, Conn.; **Chemical Controls in the Manufacture of Duplex Malleable,** Walter R. Jaeschke, Whiting Co., Harvey, Ill.; **Recent Developments in Malleable Iron,** Norman Birch, Albion Malleable Iron Co., Albion, Mich.

Steel—**AFS Research Investigating the Formation of Macro-Inclusions in Steel Castings; Metal Reactions of Concern to the Furnace Operator; Vacuum Melting Techniques; Press Forging of High-Alloy Steel Castings; Developments in High-Strength Steel Castings; Microradiography of Steel Castings, and Important Developments in the European Steel Foundry Industry.**



ELECTRON BEAM UNIT HAS HIGH OUTPUT: Temescal Metallurgical Corp., Berkeley, Calif., has built a three-story electron beam furnace which has the capacity to melt and refine 1 million lb per year of specialty steels and refractory metals. It can produce ingots up to 6 ft long and 20 in. in diam. Metal raw materials are bombarded with a beam of electrons which heats the metals up instantaneously. Because melting is done in a vacuum, impurities are drawn off. Shown here is the upper portion of the furnace containing the bar feed assembly, diffusion pump chambers, and casting chamber. Temescal is planning to produce commercial quantities of electron beam-melted materials with this first unit for both military and nonmilitary applications

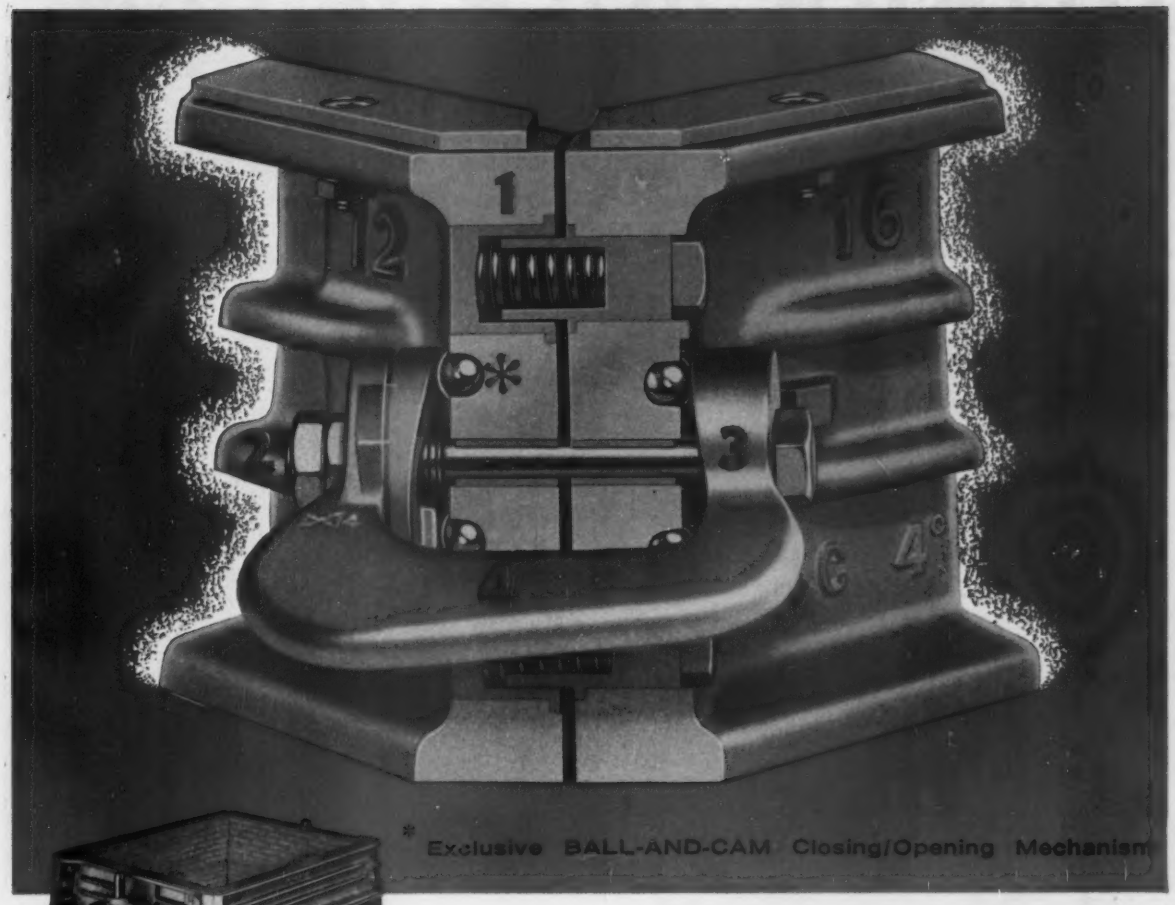
Steel Founders' Society Holds Fall Meeting Sept. 25-26

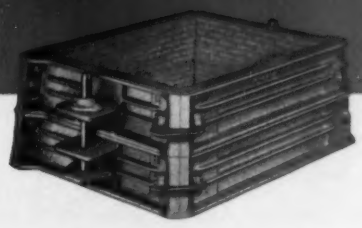
The Steel Founders' Society of America will hold its 59th annual fall meeting at the Homestead, Hot Springs, Va., on Sept. 25-26.

SFSA President W. H. Moriarty, National Castings Co., Cleveland, will open the meeting with an ad-

(*Concluded on Page 29*)

New Snap-Flask Locking Device...





THE STERLING SlipSter

The New Sterling SlipSter offers precisely the advantages you want for your flask operations . . . ease of use, speed with quality production, minimum servicing. Whatever your requirements . . . single or double pin closing, hardened steel bushings, handles, trunnions and upsets . . . the SlipSter fills every need more efficiently.

Your Sterling representative will be glad to show how you and your foundry will benefit.

1. Shielded-spring sleeve design eliminates frequent lubrication and servicing.
2. Floating Cam provides easy 1-Point Servicing.
3. Easy operating Split Cam produces maximum opening.
4. Broad-faced handles assure instant, positive opening/closing.

Sterling WORLD WIDE SERVICE

STERLING NATIONAL INDUSTRIES, INC.

MILWAUKEE, WISCONSIN • ASSOCIATE: STERLING FOUNDRY SPECIALTIES LTD., LONDON • BEDFORD • JARROW-ON-TYNE, ENGLAND

For More Information Circle 573, Page 39

OTTAWA SILICA SANDS...

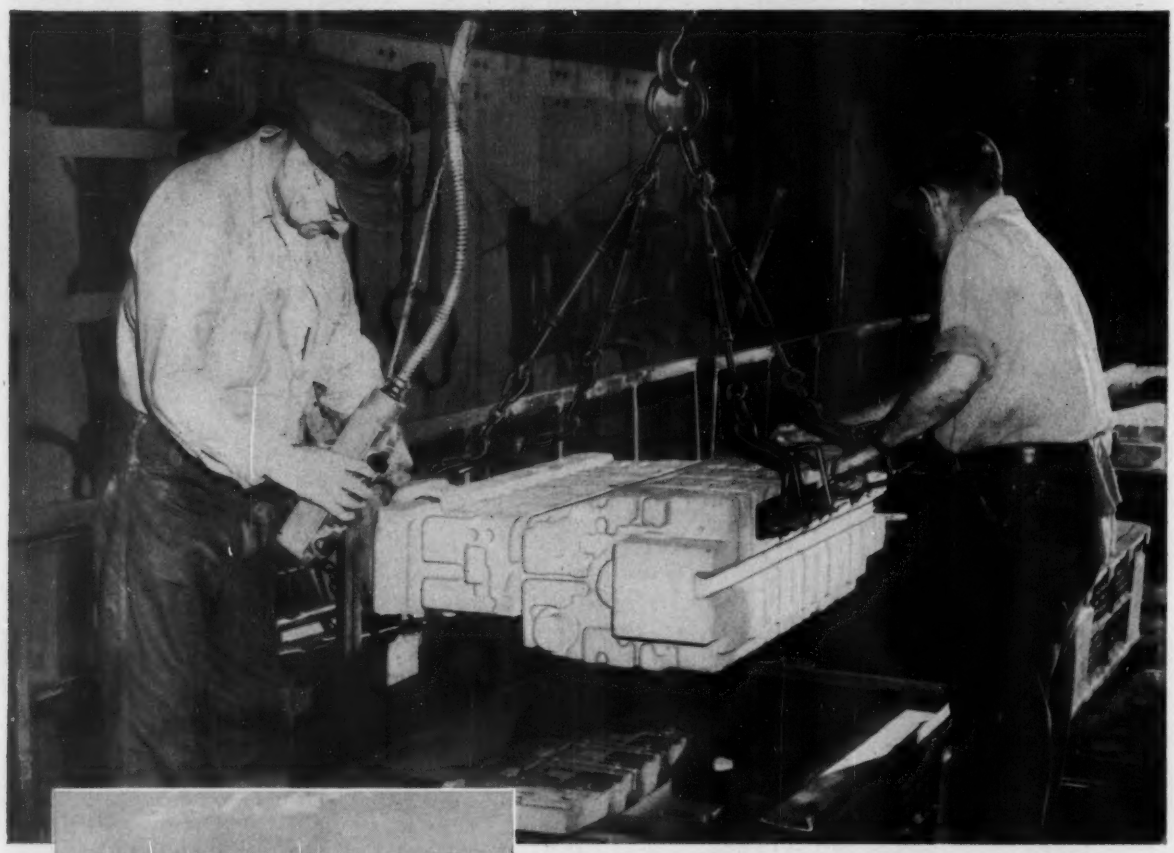


Photo courtesy of Caterpillar Tractor Co.

CORE SETTING STATION AT CATERPILLAR TRACTOR CO.
Cylinder block line, Peoria, Illinois plant.

Caterpillar Tractor Co. has used Ottawa Silica Sand for 30 years for these reasons: Availability — performance — cost. Caterpillar requires large tonnages of core sand and must have a dependable source of supply. Cores produced with Ottawa silica sand are uniform in hardness. Two important cost-saving factors are *low oil requirements and high reclaimability.*

Look to Ottawa Silica for . . .

- ROUNDNESS OF GRAIN
- FREEDOM FROM AGGLOMERATES
- GRAIN SIZE CONTROL, car-after-car.

Mail us your type of metal and size of casting section—we will be happy to send recommendations for grain size.

A Caterpillar crawler tractor FJP at work on trans-Canadian Highway, near Field, B.C., Canada (core of engine block produced with Ottawa Silica Sand).

99.9%
PURE SILICA

Serviced by two main trunk railway systems, Ottawa Silica offers fast delivery to all corners of the nation.

OTTAWA SILICA COMPANY

OTTAWA, ILLINOIS

SUBSIDIARY PLANTS:

Standard Silica Co., Ottawa, Ill.
Michigan Silica Co., Rockwood, Mich.

SERVING THE FOUNDRY, GLASS, CERAMIC AND CHEMICAL INDUSTRIES FOR OVER 50 YEARS

(*Concluded from Page 26*)
dress. Guest speakers include William L. Swager, Battelle Memorial Institute, who will speak on "The Impact of Technological Change"; C. Wilson Randle, Booz, Allen, & Hamilton, whose topic will be "Factors Behind Business Success"; and David Shea Teeple, research consultant, who will present a discussion of "Business and Political Communication."

F. Kermit Donaldson, SFSA executive vice president, will give a report and C. E. Grigsby, American Steel Foundries, chairman of the society's Program Evaluation Committee, will describe the committee's progress.

Gray Iron Foundries Worked at 68 Per Cent Capacity In June

Monthly business report of the Gray Iron Founders' Society for June indicates that 164 gray iron foundries operated at 67 per cent of ideal capacity during that month. This compares with 71 per cent reported in May by a comparable group.

Of the total, 48 foundrymen considered the shipping outlook for July to be about the same as June, 21 thought it would be up, and 95 predicted it would go down. Vacations were mentioned by 76 of the 95 who look for lower shipments as the reason for the expected drop.

Increased Use Of Magnesium Is Association Campaign Aim

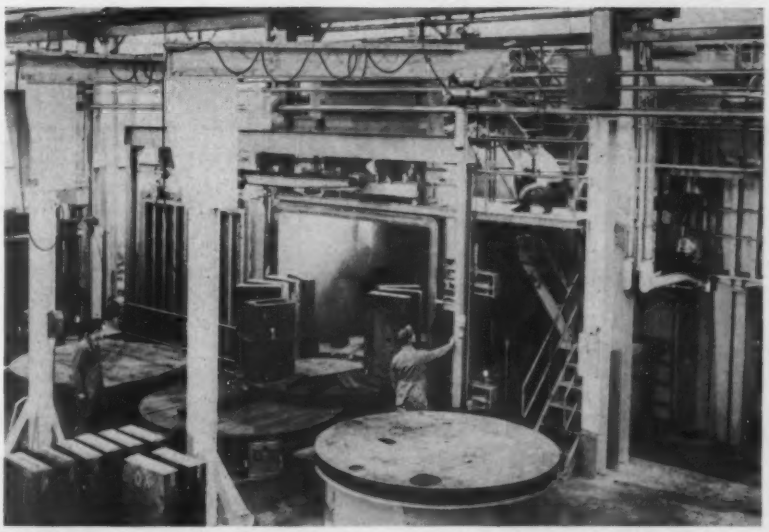
The Magnesium Association has made plans for a promotional campaign, largely by direct mail, directed to engineering and design personnel to stimulate new interest in magnesium. Advantages inherent in the metal, other than weight saving, will be stressed. Technical data sheets each featuring a single application, postcard mailings, and a quarterly newspaper, *Magnesium in Motion*, will be employed.

EQUIPMENT ARRIVES FOR NEW FOUNDRY: Officials of National Cash Register Co., Dayton, Ohio, are shown beside the truck which carried the first shipment of equipment for the company's new foundry. From left to right are W. J. Doelker, metallurgical research department; I. W. Mohr, foundry foreman; G. T. Rinehart, supervisor; and G. C. Petrosky, factory layout department. Much equipment for the new foundry, which is due to be completed this year, is being built and installed by Jeffrey Mfg. Co., Columbus, Ohio.

In addition, a feature of the 17th annual convention of the association in New York on Oct. 16-18 will be an exhibit of 101 commercial uses of magnesium.

Fenn College Offers Courses

The Technical Institute of Fenn College, Cleveland, is offering two courses of interest to foundrymen,



VACUUM-MELTED METALS: Availability of a wide variety of vacuum-melted alloys and forms from one source has been made possible through the integration and use of several Howe Sound Co. production facilities for which Waimet Alloys Co., Dearborn, Mich., will handle international sales and technical services. One of Howe's vacuum-melted alloy production facilities is this induction vacuum melting unit, one of the largest ever built in the U.S.A.

AT THE HEART OF INDUSTRY...

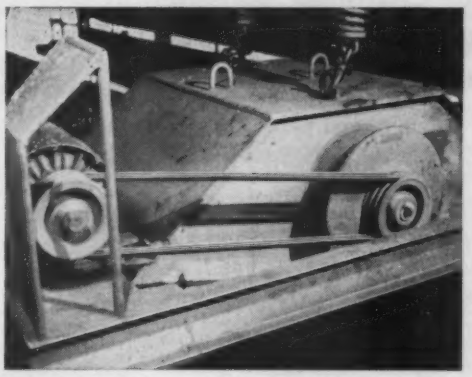
In the tough jobs like this one, U.S. Rainbow® Sandblast Hose demonstrates its exceptional qualities most clearly. Carrying sand or steel shot after other hoses have been worn useless, this US hose provides safety as well as long wear. Its durable rubber tube is especially treated with a highly conductive material to dissipate static electricity, and its strong carcass flexes easily to prevent kinking and simplify control of the discharge end.

H 122

Helping to increase efficiency in difficult foundry tasks, US Industrial Rubber Products make these jobs quicker, less fatiguing, more profitable. As the world's largest producer of Industrial Rubber Products, US not only keeps posted on the needs of foundry-type operations, but supplies the products to fill them.

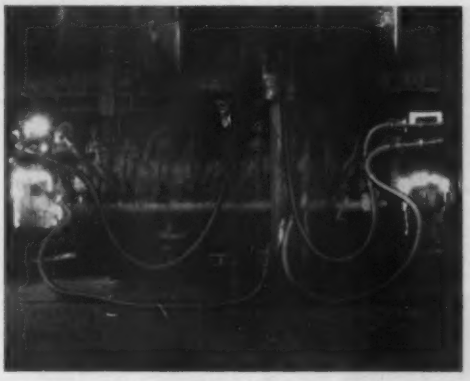
"Takes terrific heat and loves it" aptly describes the US HTB Glass Fabric Belt. Unlike competitive hot materials belts, the US HTB eliminates premature splice failure and abrasion wear, prevents early heat aging. Thoroughly tested on the toughest jobs, the US HTB gives maximum performance under the highest operating temperatures.

CB 111



U. S. Royal V-Belts provide top efficiency, exceptional length stability, uniformity on all types of drives. These belts were especially chosen for this job because they give maximum reliability, safety, and profitable running. On jobs throughout industry, U.S. Royal V-Belts are known for their exceptionally high torque transmission and because they eliminate so many metal parts.

VB115



Kaiser Steel depends on U. S. Peerless® Water Hose to prevent costly pipe skid burn at its Fontana, California, mill. This premium-quality general-purpose water hose, here carrying both cooling and heated return water, has demonstrated its superior resistance to age, abrasion, heat, and pressure in applications throughout the entire metal working industry.

H 153

For every industrial rubber product need, turn to US. For Conveyor Belts, V-Belts, the original PowerGrip "Timing"® Belt, Flexible Couplings, Mountings, Fenders, Hose and Packings . . . custom-designed rubber products of every description. Discover why U.S. Rubber has become the largest developer and producer of industrial rubber products in the world. See your U.S. Rubber Distributor or contact US directly at Rockefeller Center, New York 20, N. Y.

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

United States Rubber

MECHANICAL GOODS DIVISION

For More Information Circle 575, Page 39

For Customer Satisfaction

Barker Foundry Supply Provides Best Products, Prompt Delivery

Reliable service and the best foundry bentonites equal better castings and happy customers. This formula underlies every phase of operation of Barker Foundry Supply, distributor of Magcobar YELLOWSTONE, AUTOBOND, and SOUTHERN STAR foundry bentonites in Southern California, Arizona, and Southern Nevada. It's one of the reasons why Barker has become an outstanding success as a foundry supplier. Three other reasons are these unusually competent Barker personnel.

Bruce Farrow, a veteran of the foundry supply business, has served as President of Barker for eight years. During that time, the concern has shown a steady increase in sales and growth. He was graduated from U.C.L.A. in 1937 with a B.A. degree in Economics.

Charles Tingler, Co-owner and Vice-president, has over 13 years experience in foundry operations and over 14 years in foundry supply sales. He has been a member of the American Foundrymen's Society for 20 years. He was born in Moreland, Oklahoma.

Christy Della Rocca, Sales Engineer, served in various foundry production capacities for 18 years, topped that with another 13 years as a salesman and an inspector connected with foundries prior to joining Barker. From this experience has come his motto, which is to "give 100 percent attention to customers' problems, large or small."

These men of Barker are typical of the high-caliber Magcobar representatives located in foundry centers of the United States. So, for better castings, at lower costs, contact your local Magcobar dealer. He is ready and able to serve as a member of your castings production team.

Magnet Cove Barium Corporation

P. O. Box 355, Arlington Heights, Illinois

P. O. Box 6504, Houston, Texas

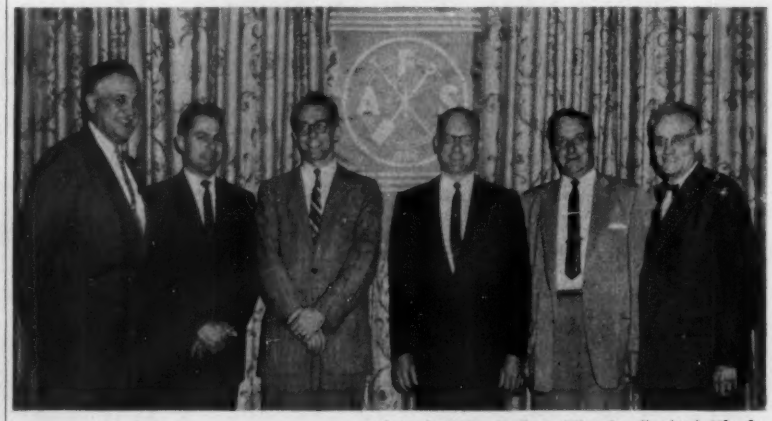
For More Information Circle 576, Page 39

starting Sept. 25. Basic Metallurgy is a two-semester lecture course dealing essentially with treatment and physical properties of ferrous and nonferrous metals and their alloys. Casting Principles is a practical lecture course for persons working in foundries or handling foundry equipment. The newest casting methods, metal handling, and melting techniques will be discussed.

Each course meets one night per week for two hours per night for 16 weeks. Registration will be held Sept. 18-22 from 6 to 8 p.m. in the Foster Engineering Bldg. Tuition for each course is $37.

Heating Equipment Orders Rise

Industrial Heating Equipment Association Inc. reports that new orders for industrial heating equipment in June totaled $9,194,000, up from the June, 1960, volume of $4,245,000. Foreign orders of $10,911,707 for the first six months of 1961 are 105 per cent above the first-half level last year.



Photos by Walter V. Napp, Milwaukee Chaplet & Mfg. Co.

CHAPTERS ELECT OFFICERS: Above are the new officers for the Metropolitan Chapter, American Foundrymen's Society. From left to right, they are L. W. Herbst, Semet Solvay Co., and K. M. DeFerrari, American Brake Shoe Co., directors; R. F. Hoffman, Worthington Corp., secretary; R. V. Hunter, Archer-Daniels-Midland Co., chairman; D. B. Slater, Whitehead Bros. Co., director; and W. H. Ruten, Polytechnic Institute of Brooklyn, treasurer. Not shown in the picture is J. D. Allen, Federated Metals Co., vice chairman.

Pittsburgh Chapter officers, front row, left to right, are Walter E. Mason, Westinghouse Air Brake Corp., vice president; C. E. Peterson, E. W. Bliss Co., president; and E. P. Buchanan, Pittsburgh Coke & Chemical Co., secretary-treasurer. In back row are A. M. Cadman, Cadman Mfg. Co.; W. D. Hacker, Mesta Machine Co.; and J. H. O'Rourke, Jones & Laughlin Steel Corp., all of whom are directors of the chapter

MAGNESIUM

HINES "POP-OFF"® FLASKS

UP TO 25% LIGHTER!

STRONGER, *too!*

SIZES AVAILABLE IN MAGNESIUM:
10" x 12" through 24" x 24"

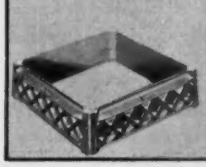
HINES POP-OFF FLASK

The many inherent advantages offered by HINES "POP-OFF" flasks are augmented by their fabrication in magnesium! The lighter weight will be appreciated by your molders. The extra strength will give you even more accurate production and lower maintenance costs. And, as always, HINES QUALITY will insure a higher percentage of perfect molds.

Here, then, is the ultimate in flask efficiency! If you're planning to improve mold production, be sure to investigate HINES *magnesium* "POP-OFF" flasks. A letter, wire or phone call will bring additional information and prices.

HINES CAST JACKETS

Used with HINES "POP-OFF" flasks, they'll provide economical, quantity production.



Less investment!

No stacks of tight flasks taking up valuable space!

Lower shake-out costs!

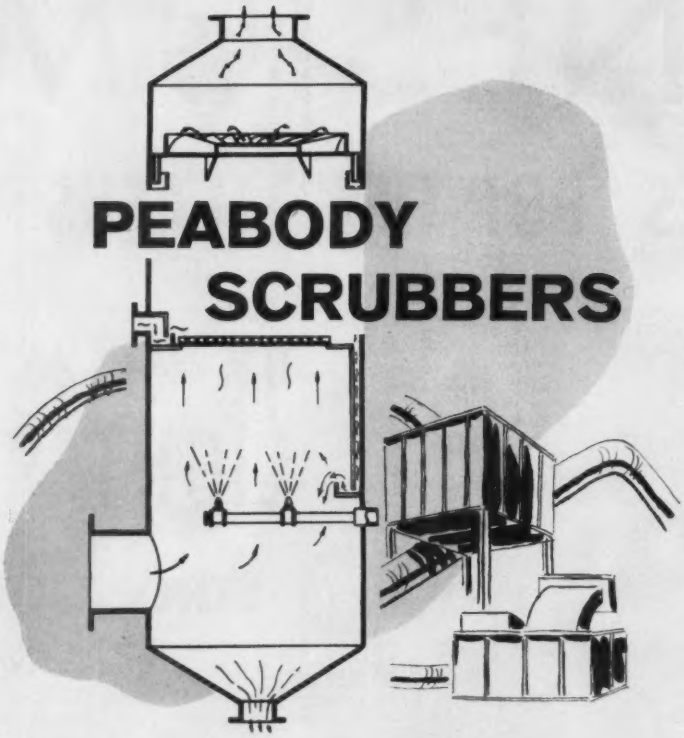
HINES

FLASK COMPANY

3431 WEST 140th STREET • CLEVELAND 11, OHIO • ORchard 1-2806

IF IT'S A "POP-OFF"... IT'S HINES... IF IT'S HINES... IT'S THE BEST

For More Information Circle 577, Page 39



PEABODY SCRUBBERS

Your Foundry's Most Efficient Wet-Type Dust Arrestors!

For air pollution problems with shake-outs, sand dryers, cupolas, shot blasts and grinders, Peabody Scrubbers are the efficient, *economical* answer.

Peabody Scrubbers offer:

- **High efficiencies over a wide range of dust-loading conditions**
- **Compact, space-saving design**
- **Light weight and—**
- **Simple, money-saving operation**

In the Peabody Scrubber, dust particles impinge on wetted targets and are carried away by a scrubbing fluid that flows across custom-designed baffle plates. Peabody Scrubbers efficiently *remove in excess of 99% (by weight) of all particles above one micron!*

Available in capacities from 1,000 up to 250,000 cfm.

Write today for complete information and Bulletin 203C on Peabody Scrubbers for all troublesome and difficult foundry dust removal applications.

1-254

PEABODY ENGINEERING CORPORATION

232 MADISON AVENUE, NEW YORK 16, N. Y.

OFFICES IN PRINCIPAL CITIES

SUBSIDIARIES

In England: **PEABODY LIMITED** In Canada: **PEABODY ENGINEERING CORPORATION OF CANADA LTD.**

Calendar of MEETINGS

Sept. 11-15—Instrument Society of America, annual Instrument-Automation Conference & Exhibit, Biltmore Hotel and Memorial Sports Arena, Los Angeles.

Sept. 18-20—Non-Ferrous Founders' Society, annual meeting, Shawnee Inn, Shawnee-on-Delaware, Pa.

Sept. 18-20—Standards Engineers Society, annual meeting, Hotel Sherman, Chicago.

Sept. 19—Electric Overhead Crane Institute, Palmer House, Chicago.

Sept. 21—Cast Bronze Bearing Institute, annual meeting. Shawnee Inn, Shawnee-on-Delaware, Pa.

Sept. 21-22—Missouri Valley Regional Foundry Conference, Missouri School of Mines and Metallurgy, Rolla, Mo.

Sept. 22-23—East Coast Regional Foundry Conference, Statler-Hilton Hotel, New York.

Sept. 24-26—Steel Founders' Society of America, fall meeting, Homestead, Hot Springs, Va.

Sept. 27-28—American Die Casting Institute, annual meeting, Edgewater Beach Hotel, Chicago.

Oct. 5-6—Ohio Regional Foundry Conference, Netherland Plaza Hotel, Cincinnati.

Oct. 5-6—Congress of German Foundrymen's Associations, Dusseldorf, Germany.

Oct. 7-10—Conveyor Equipment Manufacturers Association, annual meeting, Ponte Vedra Inn, Ponte Vedra Beach, Fla.

Oct. 13-14—New England Foundry Conference, Massachusetts Institute of Technology, Cambridge, Mass.

Oct. 16-18—Magnesium Association, annual convention, Belmont Plaza Hotel, New York.

Oct. 18-20—Gray Iron Founders' Society, annual meeting, Royal York Hotel, Toronto, Ont.

Oct. 19-20—Michigan Regional Foundry Conference, Kellogg Center, Michigan State University, East Lansing, Mich.

Oct. 19-21—Foundry Equipment Manufacturers Association, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Oct. 23-27—American Society for Metals, National Metal Congress & Exposition, Cobo Hall, Detroit.

Oct. 26-27—Purdue Metals Casting Conference, Purdue University, Lafayette, Ind.

Nov. 13-15—Steel Founders' Society of America, Technical & Operating Conference, Hotel Pick-Carter, Cleveland.

Nov. 15-17—National Foundry Association, annual meeting, Savoy-Hilton Hotel, New York.

Dec. 6-8—American Institute of Mining, Metallurgical, & Petroleum Engineers, Electric Furnace Conference, Penn-Sheraton Hotel, Pittsburgh.

1962

Jan. 22-23—Industrial Heating Equipment Association, annual winter meeting, Drake Hotel, Chicago.

Feb. 8-9—Wisconsin Regional Foundry Conference, Schroeder Hotel, Milwaukee.

March 12-13—Steel Founders' Society of America, annual meeting, Drake Hotel, Chicago.

May 7-11—American Foundrymen's Society, 66th Annual Castings Congress & Exposition (held in conjunction with the 29th International Foundry Congress), Cobo Hall, Detroit.

Sept. 1-9—German Foundry Trade Fair and annual meeting, German Foundrymen's Technical Association, Dusseldorf, Germany.

Sept. 25-28—Society of Diecasting Engineers, 2nd National Diecasting Exposition & Congress, Cobo Hall, Detroit.

3M Abrasives Boost Aluminum Grinding Output 50%

Cast aluminum transformer heads are manufactured here at National Aluminum's Peoria, Illinois, plant. Gates, risers, flashings and parting lines must be ground off prior to assembly. The abrasive belts in use—a standard glue-bonded type—were proving unsatisfactory: low production volume, excessive down time were keeping costs high.

After analysis of the operation, the 3M Representative suggested the use of tough, resin-construction "Three-M-ite" Resinbond belts, with a specific belt lubricant.

Now this difficult grinding job is done faster and better. National Aluminum reports a 50% increase in the number of units ground and a corresponding decrease in abrasive costs!

Why not let 3M's new COST CHECK 5-4-5 Program help you to effectively investigate ways to lower costs and increase production. Discover:

- If your grinding can be done more economically
- If your finishing is as efficient as possible
- If your polishing can be done faster and better

Send today for a free COST CHECK 5-4-5 Review Form *without obligation.* Put 3M's years of abrasive know-how at your disposal.

SEND IN TODAY

3M COMPANY, Dept. AAD-91
900 Bush Ave., St. Paul 6, Minn.
Send me my Free COST CHECK 5-4-5 Kit

COST CHECK 5-4-5

NAME_____
TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ STATE_____

3M Coated Abrasives

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

"3M" AND "THREE-M-ITE" ARE REGISTERED TRADEMARKS OF 3M CO., ST. PAUL 6, MINN. EXPORT: 99 PARK AVE., NEW YORK 16. CANADA: LONDON, ONTARIO

Thinking of automation?

The Universal Mold Conveyor is typical Jeffrey automation equipment – moves molds on the level, up, down and around.

Jeffrey builds single units and/or builds the entire system

Your men work at elevations best suited to each operation, with the Jeffrey universal mold conveyor on the job. Their tasks are eased and manufacturing efficiency is maintained at high levels, helping to boost earnings.

Flow of such materials as sand, castings, coke, limestone and iron borings is handled by Jeffrey vibrating feeders and conveyors, electric or mechanical types. They may serve as cooling conveyors, carrying castings from shakeout, and even the most fragile castings are handled safely.

Jeffrey mechanizes the handling of sand; overhead belt conveyors distribute sand to molders' stations, carry it from shakeout to Jeffrey sand conditioning plant and back to molders. Catalog 911 describes all of this foundry equipment. For a copy, write The Jeffrey Manufacturing Company, 907 N. Fourth Street, Columbus 16, Ohio.

JEFFREY

If it's conveyed, processed or mined, it's a job for Jeffrey.

Reader Information Service

Advertising content in FOUNDRY is classified by subject and listed by page number for your convenience when studying specific foundry applications. For further information on subjects advertised, refer to advertisement on the page indicated and circle Item Number on Reader Service Card—Page 39

SUBJECT INDEX

Abrasives (shot and grit) 128, 140, 215
Abrasive belts 35, 59
Abrasive wheels 59, 90, 112-113, 125, 143, 174, 184
Abrasives (others) 143
Alloying agents (ferrous metal) 127, 138
Alloying agents (nonferrous metal) 127, 161, 163
Aluminum alloy 1, 43, 179, 232
Belting (conveyor and power transmission) 30-31, 53
Binders (cereal) 22, 155, 220
Binders (oil) 48, 123
Binders (resin) 9, 183, 209, 220
Binders (sodium silicate) 219
Bins, Hoppers, Silos, Gates IFC, 221
Blast cleaning equipment 44, 193
Boards and Plates 222
Boxes (shipping, stacking, and tote) 124
Brass and Bronze ingot 194
Buckets 219
Casting machines (centrifugal) 219
Casting machines (permanent mold) 107
Chain and Rope 10
Chaplets, Chills, Nails 98-99, 140, 154, 175
Charging machines (furnace) 236
Chipping tool 141
Chromium alloys 127
Clay (bonding) 32, 48, 108
Coke 15, 45, 133, 182, 222
Compressors (air) 51, 87
Conveyors IFC, 36, 96, 106, 153, 162, 185, 186-187, 189, BC
Coreblowing machines 8, 186-187, 211
Coremaking machines 47, 60
Coreshooting machines 173
Cores (ceramic) 170
Cranes 101, 102
Crucibles and Pots 192
Cupolas 21
Cutting carbon 160
Degasifiers and Deoxidizers 214
Dust control equipment 12, 34, 49, 195
Electrodes and Holders 46, 110
Engineering services 120, 221, 223, BC
Exhaust and Ventilation 2
Finishings (for castings) 218
Flasks and related equipment 27, 33, 54, 164
Flour 202
Fluxes 185, 197
Foundry (for sale) 234
Furnaces (all types) 42, 115, 148, 156, 176-177, 192, 200, 222
Gaggers 143
Gases 55, 119, 144-145, 166
Gassing equipment 55
Graphite 52
Grinding machines 57, 118, 141, 218
Hot blast equipment 21, 236
Idlers (conveyor) 186-187
Impregnating systems 217
Ingot molds 192
Inoculant 57, 127
Iron powder and briquets 201
Ladles 137, 214, 236
Lubricants 134
Manganese alloys 127
Molding machines (green sand) 24-25, 130-131, 168-169, 204, 213
Molding machines (shell mold) 47, 60, 186-187
Mold closing machine 171
Nickel 163, 194
Ovens (all types) 14, 207
Parting compounds 48
Patterns and equipment 216
Pebbles 220
Pig iron 6-7, 15, 93, 190-191
Portable tools (electric and pneumatic) 57, 141, 218
Pulleys (magnetic) 106
Pyrometers 165
Radiographic equipment and supplies 135, 151, 214
Rammer, Butts, Peins 202
Refractory gating components 11, 147, 202, 218
Refractory guns 109
Refractory lining materials 13, 153, 180
Release agent 58
Rollover draw machine 24-25, 168-169, 171
Rollover machine 171
Safety equipment 199
Sand 28, 89, 95, 202, 221
Sand control 222, 223, 232
Sand handling 96
Sand preparation equipment IFC, 50, 149, 186-187, 220, 232
Sand reclamation equipment IFC, 41
Screens 41, 50, 232
Sea coal 48
Sealing compounds (mold) 5
Silicon 165
Soda ash 217
Spraying equipment 220
Stainless steel 109
Stripping machine 171
Testing equipment 142, 152, 222, 223
Thermocouples and Tubes 216
Trucks and Front-End loaders 117, 129, 216
Valves (air and hydraulic) 16
Vibrators 50, 106, 139, 162
Washes (core and mold) 48, 158, IBC

FOUNDRY

Reader Information Service

Just mail one of these cards—for more information on anything advertised in this issue . . . for further data on products described in the Equipment and Supplies section (Page 91) . . . to get copies of publications listed in the Literature for Foundrymen section (Page 181) . . . to request extra copies of editorial articles.

Index of Equipment and Supplies & Literature for Foundrymen, by Item Numbers

Equipment and Supplies Section (Page 91)

PRODUCT	ITEM NUMBER
Gas Burners	451
Vibrating Conveyors	452
Gouging Nozzles	453
Surface Thermometer	454
Inspection Flashlights	455
Hot Corebox Vents	456
Veining Preventive	457
Welding Torch	458
Stoper Head Assembly	459
Belt Sander	460
Welder Converters	461
Bronze Alloy	462
Cutoff Grinding Wheels	463
Overhead Crane	464
Core and Mold Washes	465
Mobile Floor Crane	466
Insulating Fire Brick	467
Waterless Hand Cleaner	468
Riser Sleeves	469
Aluminum Cleaner	470
Air Scrubber	471
Lift Truck Modification	472
Air Grinders	473
Grinding Wheel Transporter	474
Air Cylinders	475
Railroad Car Vibrator	476
Paint Spray Booths	477
Polishing Supplies	478
Grinding Wheel Adapter Kit	479
Grinding Wheel	480
Casting Repair Compound	481
Abrasive Blasting Hood	482
Vises	483
Aluminum Ingot	484
Steel Pallet Boxes	485
Vibratory Finishing Unit	486
Sand Thrower	487
Coreblower	488

Literature for Foundrymen Section (Page 181)

PRODUCT	ITEM NUMBER
Ultraviolet Spectrophotometer	410
Blasting Abrasives	411
Steel Storage Equipment	412
Overhead Cranes	413
Roof Ventilators	414
High-Pressure Hose Fittings	415
Mold Ovens	416
Copper-Lithium Alloys	417
Level Control Systems	418
Covering and Refining Fluxes	419
Consulting Engineers	420
Grizzly Feeders	421
Scrubbers	422
Laboratory Heating Apparatus	423
Hardness Tester	424
Diecasting Machines	425
Aluminum Melting Refractories	426
Load Cell Systems	427
Front End Loaders	428
Flasks	429
Pneumatic Products	430
Dye Penetrant Inspection	431
Grinders and Buffers	432
Bag-Type Dust Arresters	433
Recorders and Controllers	434
Electrolytic Polishing	435
Core Oil Polymers	436
Spiral Bevel Speed Reducers	437
Heat Processing Equipment	438
Water-Cooled Compressors	439
Thermocouple Materials	440
Lift Truck Rental	441

FOUNDRY

SEPTEMBER 1961

401	431	461	491	521	551	581	611	641	671	701	731	761	791	821	851
402	432	462	492	522	552	582	612	642	672	702	732	762	792	822	852
403	433	463	493	523	553	583	613	643	673	703	733	763	793	823	853
404	434	464	494	524	554	584	614	644	674	704	734	764	794	824	854
405	435	465	495	525	555	585	615	645	675	705	735	765	795	825	855
406	436	466	496	526	556	586	616	646	676	706	736	766	796	826	856
407	437	467	497	527	557	587	617	647	677	707	737	767	797	827	857
408	438	468	498	528	558	588	618	648	678	708	738	768	798	828	858
409	439	469	499	529	559	589	619	649	679	709	739	769	799	829	859
410	440	470	500	530	560	590	620	650	680	710	740	770	800	830	860
411	441	471	501	531	561	591	621	651	681	711	741	771	801	831	861
412	442	472	502	532	562	592	622	652	682	712	742	772	802	832	862
413	443	473	503	533	563	593	623	653	683	713	743	773	803	833	863
414	444	474	504	534	564	594	624	654	684	714	744	774	804	834	864
415	445	475	505	535	565	595	625	655	685	715	745	775	805	835	865
416	446	476	506	536	566	596	626	656	686	716	746	776	806	836	866
417	447	477	507	537	567	597	627	657	687	717	747	777	807	837	867
418	448	478	508	538	568	598	628	658	688	718	748	778	808	838	868
419	449	479	509	539	569	599	629	659	689	719	749	779	809	839	869
420	450	480	510	540	570	600	630	660	690	720	750	780	810	840	870
421	451	481	511	541	571	601	631	661	691	721	751	781	811	841	871
422	452	482	512	542	572	602	632	662	692	722	752	782	812	842	872
423	453	483	513	543	573	603	633	663	693	723	753	783	813	843	873
424	454	484	514	544	574	604	634	664	694	724	754	784	814	844	874
425	455	485	515	545	575	605	635	665	695	725	755	785	815	845	875
426	456	486	516	546	576	606	636	666	696	726	756	786	816	846	876
427	457	487	517	547	577	607	637	667	697	727	757	787	817	847	877
428	458	488	518	548	578	608	638	668	698	728	758	788	818	848	878
429	459	489	519	549	579	609	639	669	699	729	759	789	819	849	879
430	460	490	520	550	580	610	640	670	700	730	760	790	820	850	880

SEND COPIES OF FOLLOWING ARTICLES IN THIS ISSUE

Page No. Title of Article

....

....

Circle item number for further information on anything described or advertised in this issue

CARD INVALID WITHOUT COMPANY NAME—TYPE OR PRINT

NAME _____

TITLE _____

COMPANY _____

PRODUCT MANUFACTURED _____

ADDRESS _____

CITY _____ ZONE_____

STATE _____

This card good until Nov. 15, 1961

FOUNDRY

SEPTEMBER 1961

401	431	461	491	521	551	581	611	641	671	701	731	761	791	821	851
402	432	462	492	522	552	582	612	642	672	702	732	762	792	822	852
403	433	463	493	523	553	583	613	643	673	703	733	763	793	823	853
404	434	464	494	524	554	584	614	644	674	704	734	764	794	824	854
405	435	465	495	525	555	585	615	645	675	705	735	765	795	825	855
406	436	466	496	526	556	586	616	646	676	706	736	766	796	826	856
407	437	467	497	527	557	587	617	647	677	707	737	767	797	827	857
408	438	468	498	528	558	588	618	648	678	708	738	768	798	828	858
409	439	469	499	529	559	589	619	649	679	709	739	769	799	829	859
410	440	470	500	530	560	590	620	650	680	710	740	770	800	830	860
411	441	471	501	531	561	591	621	651	681	711	741	771	801	831	861
412	442	472	502	532	562	592	622	652	682	712	742	772	802	832	862
413	443	473	503	533	563	593	623	653	683	713	743	773	803	833	863
414	444	474	504	534	564	594	624	654	684	714	744	774	804	834	864
415	445	475	505	535	565	595	625	655	685	715	745	775	805	835	865
416	446	476	506	536	566	596	626	656	686	716	746	776	806	836	866
417	447	477	507	537	567	597	627	657	687	717	747	777	807	837	867
418	448	478	508	538	568	598	628	658	688	718	748	778	808	838	868
419	449	479	509	539	569	599	629	659	689	719	749	779	809	839	869
420	450	480	510	540	570	600	630	660	690	720	750	780	810	840	870
421	451	481	511	541	571	601	631	661	691	721	751	781	811	841	871
422	452	482	512	542	572	602	632	662	692	722	752	782	812	842	872
423	453	483	513	543	573	603	633	663	693	723	753	783	813	843	873
424	454	484	514	544	574	604	634	664	694	724	754	784	814	844	874
425	455	485	515	545	575	605	635	665	695	725	755	785	815	845	875
426	456	486	516	546	576	606	636	666	696	726	756	786	816	846	876
427	457	487	517	547	577	607	637	667	697	727	757	787	817	847	877
428	458	488	518	548	578	608	638	668	698	728	758	788	818	848	878
429	459	489	519	549	579	609	639	669	699	729	759	789	819	849	879
430	460	490	520	550	580	610	640	670	700	730	760	790	820	850	880

SEND COPIES OF FOLLOWING ARTICLES IN THIS ISSUE

Page No. Title of Article

....

....

Circle item number for further information on anything described or advertised in this issue

CARD INVALID WITHOUT COMPANY NAME—TYPE OR PRINT

NAME _____

TITLE _____

COMPANY _____

PRODUCT MANUFACTURED _____

ADDRESS _____

CITY _____ ZONE_____

STATE _____

This card good until Nov. 15, 1961

FOUNDRY

SEPTEMBER 1961

401	431	461	491	521	551	581	611	641	671	701	731	761	791	821	851
402	432	462	492	522	552	582	612	642	672	702	732	762	792	822	852
403	433	463	493	523	553	583	613	643	673	703	733	763	793	823	853
404	434	464	494	524	554	584	614	644	674	704	734	764	794	824	854
405	435	465	495	525	555	585	615	645	675	705	735	765	795	825	855
406	436	466	496	526	556	586	616	646	676	706	736	766	796	826	856
407	437	467	497	527	557	587	617	647	677	707	737	767	797	827	857
408	438	468	498	528	558	588	618	648	678	708	738	768	798	828	858
409	439	469	499	529	559	589	619	649	679	709	739	769	799	829	859
410	440	470	500	530	560	590	620	650	680	710	740	770	800	830	860
411	441	471	501	531	561	591	621	651	681	711	741	771	801	831	861
412	442	472	502	532	562	592	622	652	682	712	742	772	802	832	862
413	443	473	503	533	563	593	623	653	683	713	743	773	803	833	863
414	444	474	504	534	564	594	624	654	684	714	744	774	804	834	864
415	445	475	505	535	565	595	625	655	685	715	745	775	805	835	865
416	446	476	506	536	566	596	626	656	686	716	746	776	806	836	866
417	447	477	507	537	567	597	627	657	687	717	747	777	807	837	867
418	448	478	508	538	568	598	628	658	688	718	748	778	808	838	868
419	449	479	509	539	569	599	629	659	689	719	749	779	809	839	869
420	450	480	510	540	570	600	630	660	690	720	750	780	810	840	870
421	451	481	511	541	571	601	631	661	691	721	751	781	811	841	871
422	452	482	512	542	572	602	632	662	692	722	752	782	812	842	872
423	453	483	513	543	573	603	633	663	693	723	753	783	813	843	873
424	454	484	514	544	574	604	634	664	694	724	754	784	814	844	874
425	455	485	515	545	575	605	635	665	695	725	755	785	815	845	875
426	456	486	516	546	576	606	636	666	696	726	756	786	816	846	876
427	457	487	517	547	577	607	637	667	697	727	757	787	817	847	877
428	458	488	518	548	578	608	638	668	698	728	758	788	818	848	878
429	459	489	519	549	579	609	639	669	699	729	759	789	819	849	879
430	460	490	520	550	580	610	640	670	700	730	760	790	820	850	880

SEND COPIES OF FOLLOWING ARTICLES IN THIS ISSUE

Page No. Title of Article

....

....

Circle item number for further information on anything described or advertised in this issue

CARD INVALID WITHOUT COMPANY NAME—TYPE OR PRINT

NAME _____

TITLE _____

COMPANY _____

PRODUCT MANUFACTURED _____

ADDRESS _____

CITY _____ ZONE_____

STATE _____

This card good until Nov. 15, 1961

FIRST CLASS
Permit No. 36
CLEVELAND, OHIO

BUSINESS REPLY MAIL
No Postage Stamp Necessary if Mailed in the United States
—POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio

Reader's Service Dept.

FIRST CLASS
Permit No. 36
CLEVELAND, OHIO

BUSINESS REPLY MAIL
No Postage Stamp Necessary if Mailed in the United States
—POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio

Reader's Service Dept.

FIRST CLASS
Permit No. 36
CLEVELAND, OHIO

BUSINESS REPLY MAIL
No Postage Stamp Necessary if Mailed in the United States
—POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio

Reader's Service Dept.

SALVAGE YOUR VALUABLE MOLDING SAND with a SIMPLICITY RING-TYPE CRUSHER SCREEN

188

You profit two ways with Simplicity's Ring-Type Crusher Screens

- Your used core and molding sand is crushed and screened for re-use in one operation, saving the cost of new sand .
- Transportation and dumping costs of used sand are eliminated.

This unit combines the Simplicity heavy-duty vibrating screen with free-turning cast rings mounted over crushing plates. One to three sets of rings can be supplied, depending upon the maximum lump size to be crushed.

Simplicity ring-type crusher screens are paying their way in foundries producing magnesium, steel, malleable and grey iron castings throughout the United States.

Available in many models and sizes. For complete information write today for the name of our sales engineer in your area; and turn your waste into profits.

SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.
FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario.
FOR EXPORT: Brown and Sites, 50 Church Street, New York 7, N. Y.

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND 7, MICHIGAN

For More Information Circle 581, Page 39

OOPS! Furnace down! Pouring schedule imperiled!

Maybe our cartoonist exaggerated the effect of this news on the Inductotherm offices, but at least he gives you the general idea.

Trouble doesn't often develop in Inducto high frequency induction furnaces. When it does, however, Inductotherm believes in doing something constructive about it—and pronto!

Here, in the customer's own words, is what happened:

"Inductotherm's 24-hour service saved our casting schedule,"

says SAM MINIEA, President,
Truecast Precision Casting Corporation,
Louisville, Kentucky.

"We were working a 24-hour, 7-day week schedule when our only melting furnace started delivering only half power. A hurried call to Inductotherm brought an engineer to our plant Saturday morning to diagnose and repair trouble in a loose rheostat brush. Thanks to this service expensive down-time was less than 24 hours."

Helpfulness on melting problems and the promptest kind of service to large and small customers alike is a big part of Inductotherm's concept of doing business—that plus a complete line-up of the finest kind of furnace equipment we know how to build. And it all adds up to saving you money. For the entire story, why not talk with an Inducto furnace engineer soon! Inductotherm Corporation, 10 Indel Avenue, Rancocas, New Jersey.

INDUCTOTHERM

Subsidiary for 60-cycle melting equipment—INDUCTOTHERM LINEMELT CORP.

TENZALOY

Tenzaloy Aluminum for high-strength castings without heat treatment

When you need a high-strength aluminum casting your alloy should be self-aging Tenzaloy — particularly if you want to avoid heat treatment. *Tenzaloy has this unique combination of properties:*

1. High yield and tensile strength
2. Exceptional machinability
3. Remarkable dimensional stability
4. High impact and shock resistance
5. Excellent corrosion resistance
6. Permanent, silvery-white finish

Tenzaloy castability is excellent in green sand, plaster, investment, shell, oil-bonded sand and permanent molds of all kinds. It is particularly suited to designs where load-carrying capacity, impact strength and light weight are essential, and it is used in applications where heat treated aluminum alloys, cast iron or other materials might otherwise be selected.

Write for your copy of Bulletin 103R5 to: Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York 5, N. Y.

ASARCO

Operation: Blast Cleaning

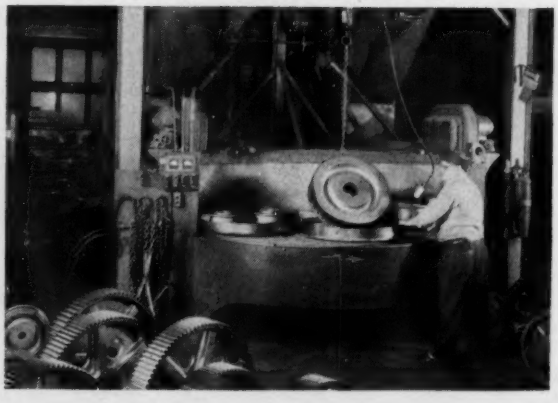
(one of a series)

THIS CASTING TOOK 15 MINUTES TO CLEAN . . .

THIS ONE ONLY 4 MINUTES WITH ROTOBLAST

No two ways about it: Rotoblast equipment cuts cleaning costs, sometimes by as much as 70%. Hundreds of manufacturers have improved their profit picture — as well as their quality of cleaning — with Rotoblast because it reduces manpower—up to 75% . . . works faster, up to 50% faster for straight through processing ...requires much less maintenance...reduces down-time.

Whether it is a small Rotoblast barrel or a giant tableroom, you'll find that the day you start using Rotoblast is the day your cleaning costs start to come down. And you'll get additional cleaning economies with the use of solid, tough, Rotoblast Steel Shot and Grit. To get the full story, write:



Pangborn

OF HAGERSTOWN

PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Md.; Pangborn Canada Ltd., 47 Shaft Rd., Toronto (Rexdale), Canada;—Manufacturers of Blast Cleaning, Vibratory Finishing, Dust Control Equipment—Rotoblast® Steel Shot and Grit®.

For More Information Circle 584, Page 39

Circle 585, Page 39→

"I'LL TAKE A MILLION TONS . . . "

Wish he would stop bothering us! Tempting as it is to receive such a big order from the Otherworld's No. 1 Heating Expert — we've got a firm policy to sell only *good* guys.

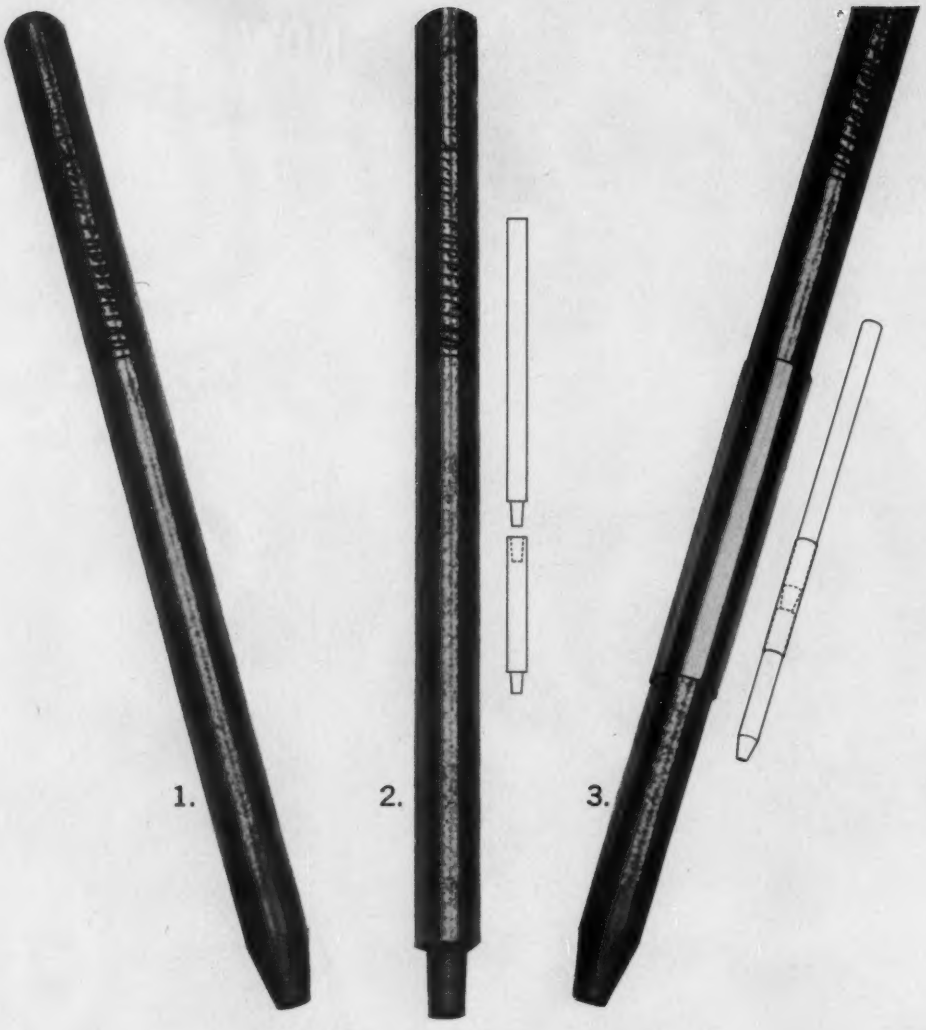
The nice thing about this policy is when we sell the good guys (and we've been selling a lot of 'em lately) they stay sold and remain good customers of ours forever.

The reasons? Koppers Coke is made from top-quality West Virginia coals, skillfully blended and baked the right amount of time. It's absolutely uniform in *size, strength, structure* and *chemical analysis*. We test every day's run to be sure.

Because of its superior physical qualities, high carbon and low ash, Koppers Coke enables you to maintain higher temperatures which increases the cleanliness of the iron and helps reduce fuel consumption.

Why not make your next order Koppers Premium Foundry Coke? It's available anywhere in the U.S. or Canada in sizes to fit your needs. P.S. Your initial order needn't be for a million tons. Anything from a carload up will be fine. Koppers Company, Inc., Pittsburgh, Pennsylvania.

Koppers Premium Foundry Coke



Which of these three Arcair carbon electrodes is best for your Arcair torch?

Any one of the three. They're all sold by your Arcair dealer. Pick the electrode that works best for your particular application.

1. Standard Electrode in sizes from 5/32" to 3/4", copper clad.

2. Jointed Electrode practically eliminates stub loss. It's tapered on one end, has a hole in the other. By joining one electrode to the next, stub loss is eliminated. Sizes 1/2" to 3/4".

3. Electrode with metal joiner tube cuts down waste, too. Get the same results more economically. Sizes 3/8" to 3/4".

You're wise to buy only *Arcair* electrodes. They withstand higher amperages, finish more pounds of metal per minute. And Arcair electrodes are less fragile, can take the rough handling of foundry work with less breakage.

No one knows as much about cutting costs with an Arcair torch as *your Arcair man.* Why not give him a call this week? Arcair Company, Bremerton, Washington and Lancaster, Ohio.

Arcair®

For More Information Circle 586, Page 39

NOW FOR BIG SHELL CORES... BEARDSLEY & PIPER SF-10A CORMATIC

Up to 90 big hollow shell cores every hour! That's the productivity of Beardsley & Piper's new SF-10A Cormatic, based on a single-cavity maximum size core box. (Multiple cavity core boxes of course increase productivity proportionately.)

Designed as a big brother to the highly successful SF-6BA, the new SF-10A Cormatic accommodates core boxes up to 30" in height, 25" in length and 800 lbs. in weight. Completely automatic, the SF-10A is equipped with both pneumatic and electric controls. An operator need only push one button to actuate the cycle. The machine clamps, blows, locks, drains, and cures cores automatically. The operator then strips the core and reactuates the cycle.

The SF-10A has a hi-lo direct gas-fired manifold with 210,000 BTU output—and either natural, manufactured or bottled gas can be used. Core box temperature is thermostatically controlled to within plus or minus five degrees. Denser, more uniform cores are always obtainable. Blow pressure can be varied from extreme lows to full line pressure. The sand magazine, of 150 lb. capacity, travels on a specially constructed track and is clamped by a pneumatic powered latch. The unit is also equipped with a 300 lb. shell sand storage hopper which automatically feeds sand into the magazine.

NO ADDITIONAL MANPOWER WITH CORMATIC

The completely automatic SF-10A provides important manpower savings for your core room. One man can operate more than one machine, thus the outstanding productivity of multiple units can be yours with no additional man-hour cost . . . another example of B&P engineered equipment to cut your costs.

Your B&P representative has complete information on this outstanding unit. He will be happy to show you how your core room can best be served by the productive, cost-cutting Cormatic. Contact him today—be more competitive tomorrow.

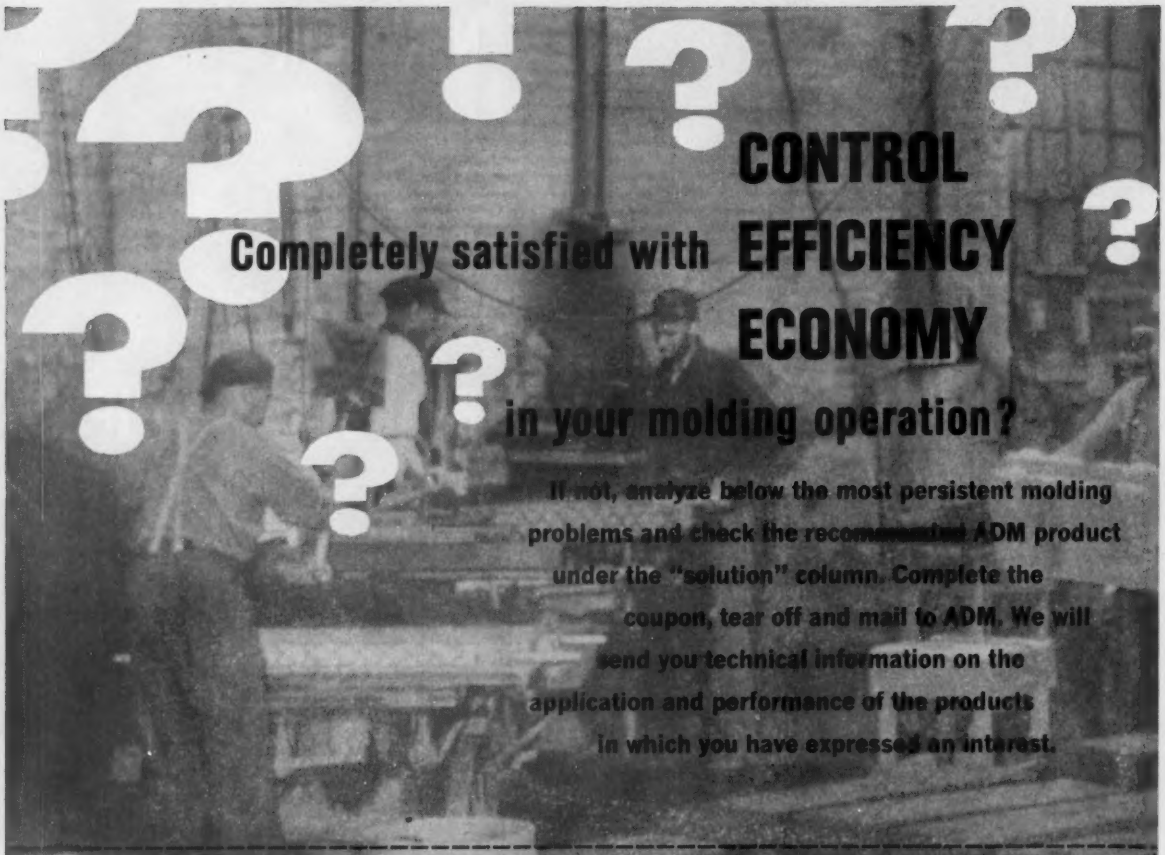
For More Information Circle 587, Page 39

ANOTHER BETTER METHOD FROM BEARDSLEY & PIPER

RESEARCH

BEARDSLEY & PIPER
Div. of Pettibone Mulliken Corp.
2424 N. Cicero Ave., Chicago 39, Ill.

FEMA



CONTROL EFFICIENCY ECONOMY

Completely satisfied with

in your molding operation?

If not, analyze below the most persistent molding problems and check the recommended ADM product under the "solution" column. Complete the coupon, tear off and mail to ADM. We will send you technical information on the application and performance of the products in which you have expressed an interest.

IF YOU HAVE A MOLDING PROBLEM:	THERE'S AN ADM SOLUTION:
☐ Do you have to clean patterns often?	☐ ARCHER PARTINGS
☐ Do you get hard surfaces in castings due to sulphur pickup?	☐ CROWN HILL SEACOAL
☐ Poor shakeout?	☐ LIN-O-CEL
☐ Are you getting clean peel?	☐ CROWN HILL SEACOAL
☐ Getting cuts, washes, erosion and inclusions?	☐ GREEN BOND BENTONITE
☐ Getting burn-in or rough surfaces?	☐ VELVA WASHES
☐ Any rat-tails, buckles, scabs or hot tears?	☐ LIN-O-CEL
☐ Is scrap rate high due to weak sand?	☐ GREEN BOND BENTONITE
☐ Soft spots from poor flowability in high-bond sand?	☐ LIN-O-CEL

OTHER PROBLEMS: _____

NAME _____ TITLE _____

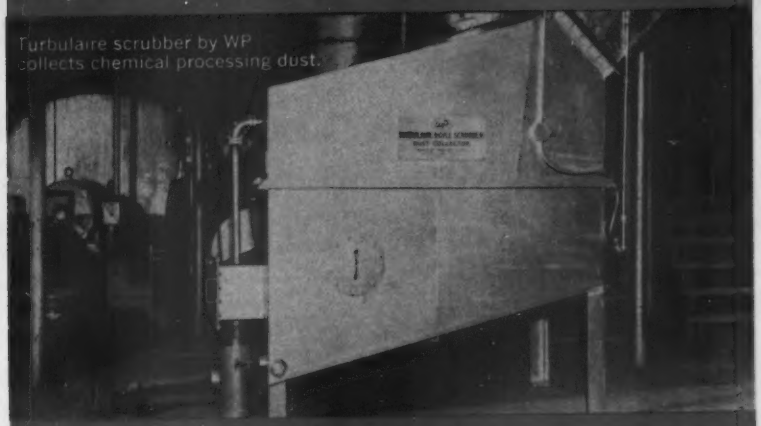
FOUNDRY _____ ADDRESS _____

CITY _____ ZONE _____ STATE _____

Archer QUALITY

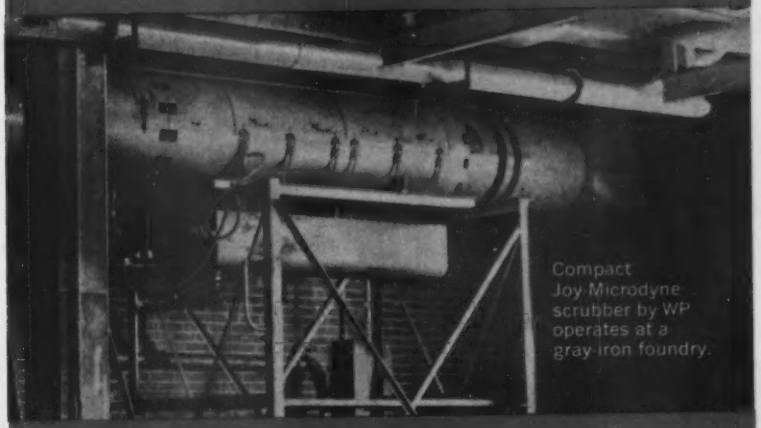
Archer-Daniels-Midland company

FEDERAL FOUNDRY SUPPLY DIVISION
2191 West 110th Street • Cleveland 2, Ohio



Turbulaire scrubber by WP collects chemical processing dust.

An Illinois chemical plant... and a Pennsylvania foundry... agree:



Compact Joy-Microdyne scrubber by WP operates at a gray-iron foundry.

When DUST is your problem— CLEAR IT WITH WP*

For an efficient, economical solution to any dust control problem—look to Western Precipitation. WP is uniquely fitted to handle your unique problem—being the one organization that custom designs, engineers and installs ALL types of dust and fume control equipment: Precipitator, Mechanical, Jet-Cleaned Filter, Hi-Temp Filter, Scrubbers and engineered combinations.

With no axes to grind for any one system, WP engineers will give your job a completely unbiased recommendation—whether it's a quote on your specifications, a single component, or a completely engineered installation . . . small, major, simple, or complex.

An inquiry—on your business letterhead—will bring you literature promptly. Just write Western Precipitation, 1000 W. 9th St., Los Angeles 54, Calif. (In Canada, write 8285 Mountain Sights Ave., Montreal, P.Q.)

Dust and fume control since 1907

*WESTERN PRECIPITATION

Los Angeles 54 • New York 7 • Chicago 2 • Pittsburgh 22 • Atlanta 5 • San Francisco 4

Division of Joy Manufacturing Company

ELECTROSTATIC Precipitators
MULTICLONE Collectors
CMP Combination Units
DUALAIRE Jet-Cleaned Filters
THERM-O-FLEX Hi Temp Filters
TURBULAIRE Scrubbers
JOY-MICRODYNE Scrubbers
also: HOLO-FLITE Processors
HI-TURBIANT Heaters
TURBULEX Processors

For More Information Circle 589, Page 39

YOU'LL DO A BETTER JOB

with H. V. ADAMS DESIGNED

HIGH EFFICIENCY FOUNDRY TOOLS

"UNIVERSAL FREE WHEELING"

FOUNDRY SAND RIDDLE

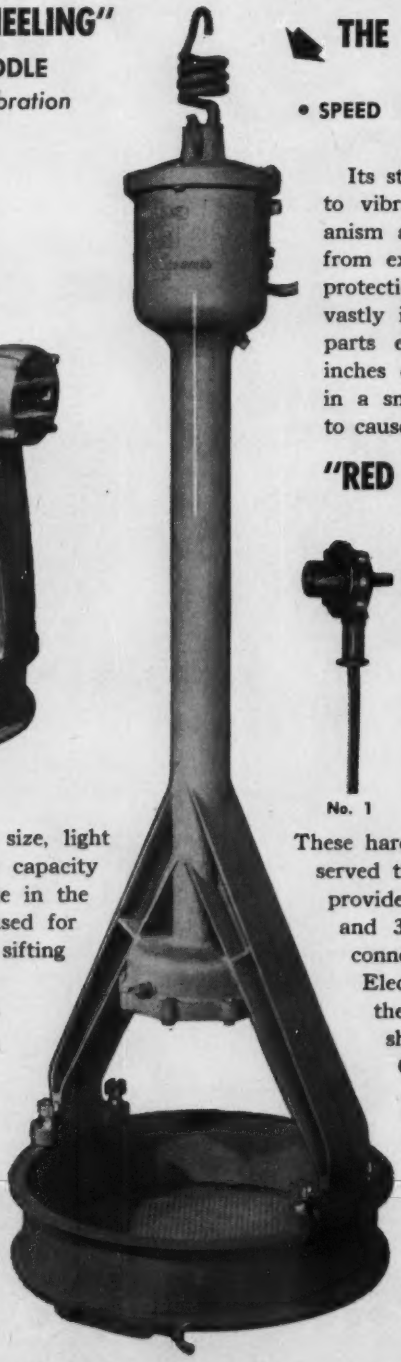
with the Double Eight Vibration

Because of its convenient size, light weight and good riddling capacity it long has been a favorite in the foundry. It also can be used for mixing core sand or for sifting sand directly into molds.

The mechanism is entirely enclosed protecting it from harmful dust and grit.

The main frame is cast in very strong tough aluminum.

It uses quick change ferruled sieves with 20 in. diameter sifting area. There are no loose wires to harm hands.



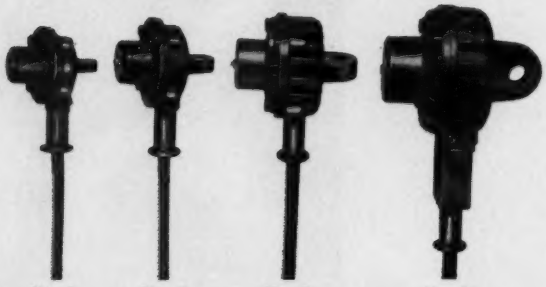
THE "ROTOPLANE" SPEED SIFTER

WILL GIVE YOU

• SPEED • ECONOMY • SAFETY • LONGER LIFE
• GREATER SIFTING CAPACITY

Its sturdy one-piece frame and long shaft add to vibration effectiveness. The sealed-in mechanism assures protection of motor and bearings from exposure to dust and grit. This sealed in protection and "Rotoplane's" free-rotary action vastly increase bearing life. No exposed moving parts endanger the operator. Sieves have 20 inches diameter clear sifting area—are mounted in a smooth steel ferrule with no jagged edges to cause dangerous cuts and scratches.

"RED (Devil) ELECTRIC" VIBRATORS



No. 1 No. 2 No. 5 No. 9

These hard hitting Adams designed Vibrators have served the foundries for over 30 years. They are provided with a 6 foot 3 wire authorized cable and 3 wire grounded connector which, when connected with our 3 wire grounded Red Electric Knee Switch, automatically grounds the vibrator protecting the worker from shock. The vibrators have passed the U. S. Government code inspection.

Other Foundry Products:

- No. 11 NOISELESS TYPE VIBRATOR
- A-20 ELECTRIC VIBRATOR
- RED ELECTRIC KNEE SWITCHES
- "ROTO" ADJUSTABLE BIN VIBRATOR
- 2 MIN. UNIVERSAL FINENESS TEST SIFTER
- UNIVERSAL TRIPOD CARRIER

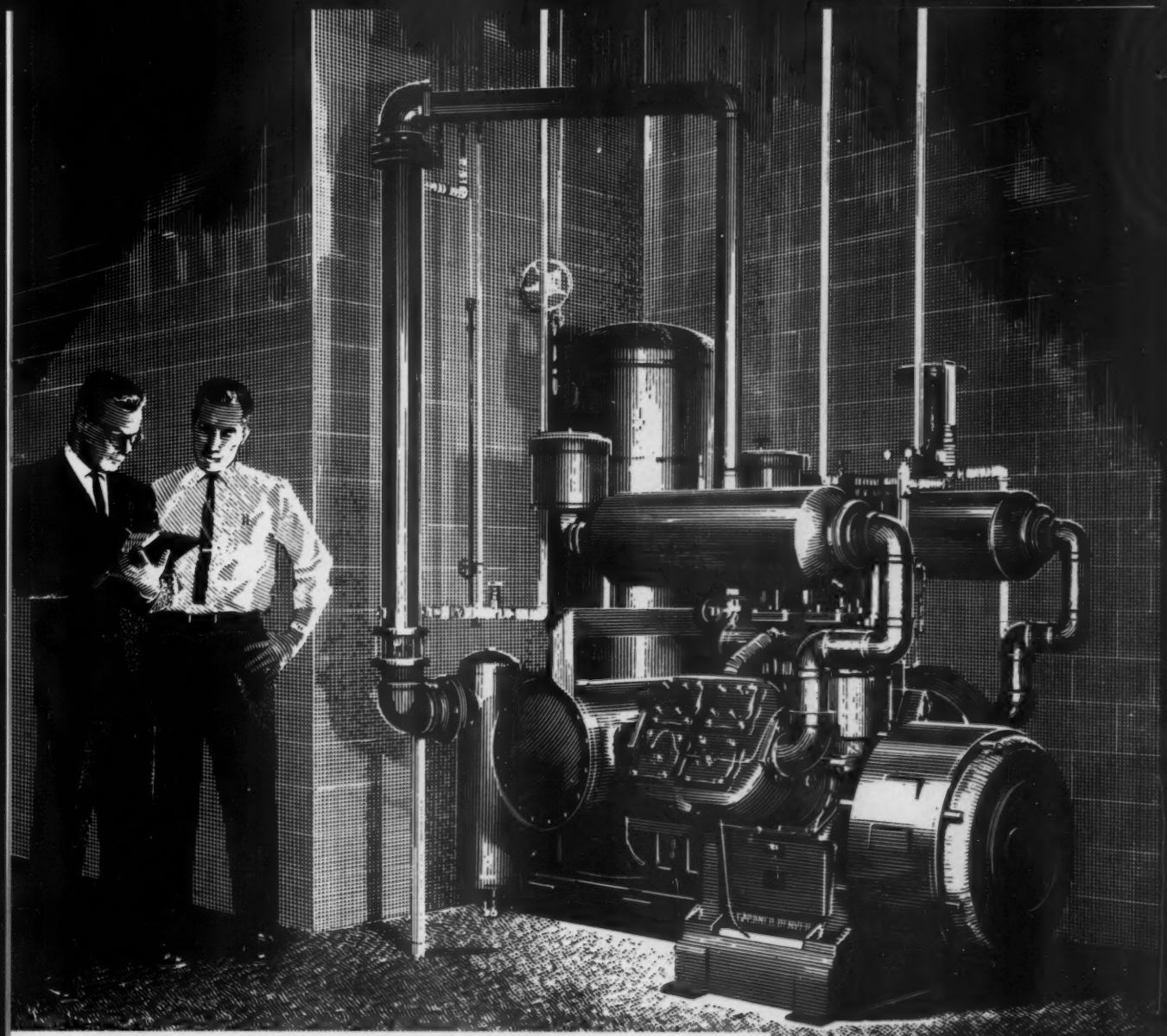
ORDER ALL SIFTERS AND VIBRATORS WITH GROUND WIRE!!

FOUNDRY SUPPLIES MANUFACTURING CO., NOT INC.

2221 Orchard Street • Chicago 14, Illinois

For More Information Circle 590, Page 39

Circle 591, Page 39→



"We pocket the difference"

The difference? Saving in floor space. No foundation cost. Quick and easy installation. The Gardner-Denver packaged air compressor goes right to work . . . provides a dependable supply of air for years. Want details? Request Bulletin WB-10.

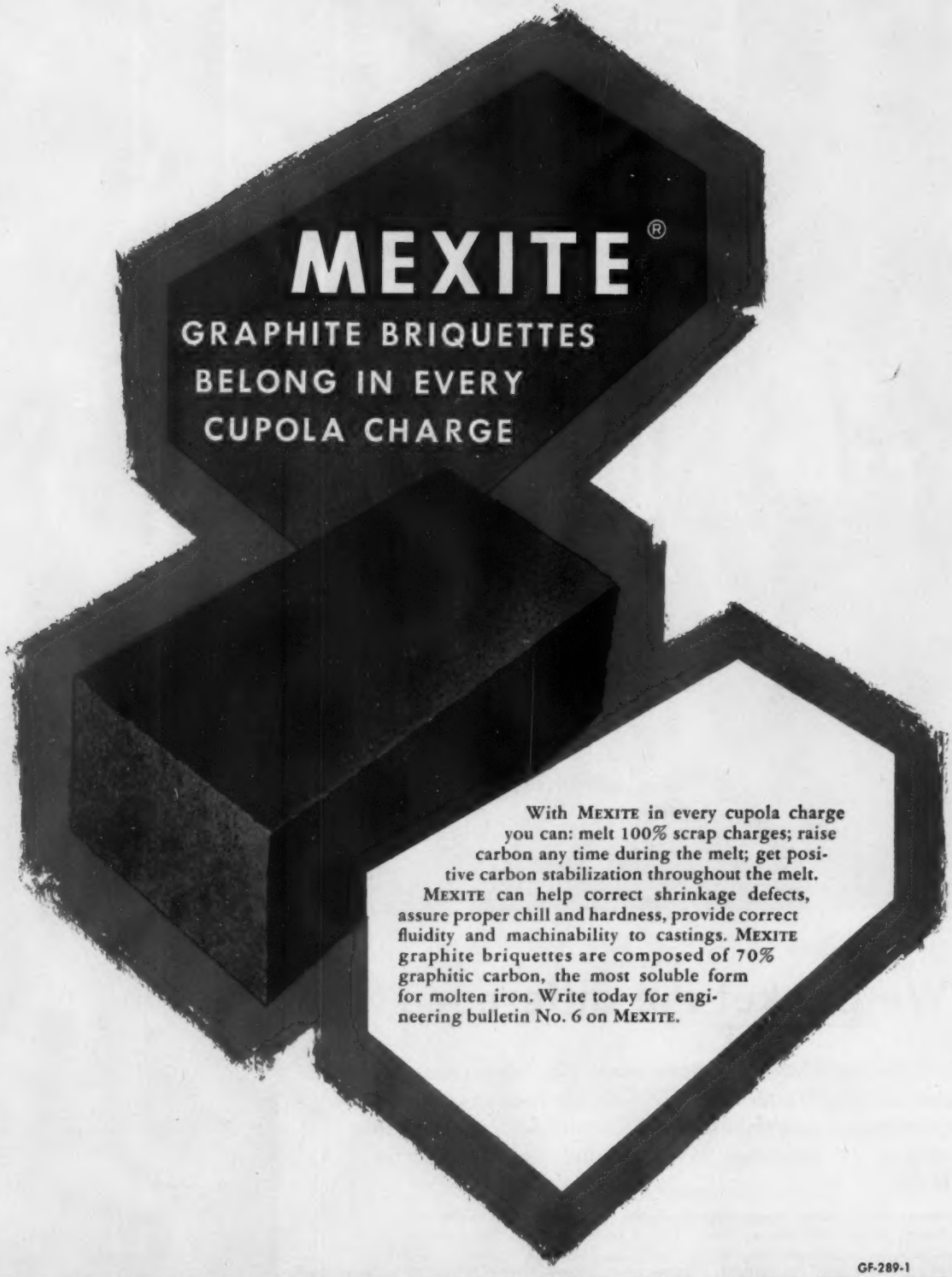
Gardner-Denver Company, Quincy, Illinois—Offices in principal U. S., Canadian and Mexican cities.
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario.

International: Gardner-Denver International Division, 233 Broadway, New York 7, N. Y.
International Offices: Buenos Aires, Argentina; Artaxmon, N.S.W. Australia; Brussels, Belgium; Rio de Janeiro, Brazil; Santiago, Chile; Barranquilla, Colombia; Lima, Peru; Ndola, N. Rhodesia; Salisbury, S. Rhodesia; Johannesburg, Transvaal.

GARDNER-DENVER Since 1859

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER



With MEXITE in every cupola charge you can: melt 100% scrap charges; raise carbon any time during the melt; get positive carbon stabilization throughout the melt. MEXITE can help correct shrinkage defects, assure proper chill and hardness, provide correct fluidity and machinability to castings. MEXITE graphite briquettes are composed of 70% graphitic carbon, the most soluble form for molten iron. Write today for engineering bulletin No. 6 on MEXITE.

GF-289-1

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION, SAGINAW 14, MICHIGAN

GRAPHITAR® CARBON-GRAPHITE • GRAMIX® POWDER METALLURGY • MEXICAN® GRAPHITE PRODUCTS • USG® BRUSHES

This belt lived 3 lives before accident killed it off

THE conveyor belt previously used in this foundry lasted only a year, had to be repaired frequently. The intense heat blistered and scorched it, hardened and cracked the rubber.

When a B.F.Goodrich distributor heard of the problem, he recommended a BFG belt that was specially developed for carrying hot materials. This belt is made with a heat-resisting rubber that can stand temperatures that char or burn ordinary rubber belts.

The B.F.Goodrich hot-material belt lasted three years—two years longer than the belt it replaced. Even then, it was an accident, not heat prostration, that killed it off. As the head of plant maintenance put it: "No one knows how long this belt might have lasted if it hadn't been accidentally ripped."

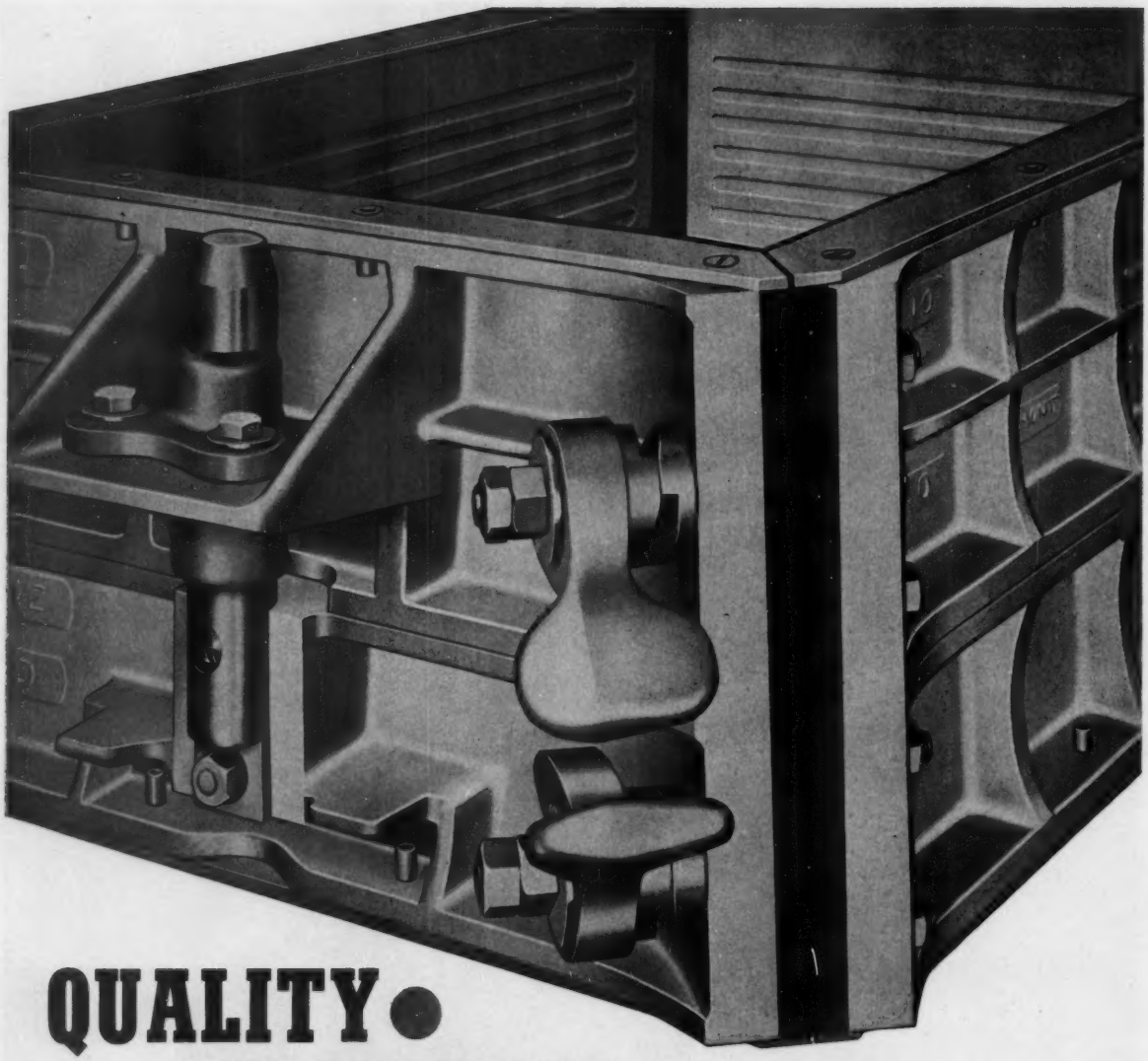
In this foundry, the purchasing agent had a good rule. Instead of accepting the high cost of frequent replacements, he called in a BFG distributor and found exactly what he needed to keep the plant running with fewer shutdowns and delays.

Your B.F.Goodrich distributor has the exact specifications for the belt described here. And, as a factory-trained specialist in rubber products, he can answer your questions about the many products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Company, Dept. M-145, Akron 18, Ohio.*

B.F.Goodrich

CONVEYOR BELTS

For More Information Circle 593, Page 39



QUALITY •
STRENGTH •
REPUTATION •
THOUSANDS IN USE •

That about sums up the story of Fremont flasks and jackets

THE

FREMONT

FLASK CO., FREMONT, O.

THE PURECO CO_2 "BLUE LINE"

cuts core hardening time from hours to seconds

SAVE WITH PURECO CO_2 "FLASH CURING"

The Pure Blue Line of quality running to your core shooter, core box or mold means extensive savings in time and money. The Pureco CO_2 "*Flash Curing*" process cuts hardening time from hours to seconds . . . no costly baking ovens are needed . . . valuable space is saved . . . more accurate castings with smoother finish result. Mold drying is eliminated . . . rapid production of finished cores expedites rush orders. In-plant handling time is drastically reduced.

"Flash Curing" installation simple.

Pureco can tailor a "*Flash Curing*" installation for production or custom work to meet your specific foundry requirements—large or small. Cost is low—installation simple.

Have a "Flash Curing" demonstration!

Pureco would like to demonstrate its "*Flash Curing*" process in your foundry under your working conditions, with no obligation on your part. Call your local Pureco man or write:

PURECO CO_2

PURE CARBONIC

Pure Carbonic Company, A Division of Air Reduction Company, Incorporated

Nation-Wide Pureco CO_2 Service-Distributing Stations in Principal Cities

General Offices: 150 East 42nd Street, New York 17, N.Y.

For More Information Circle 595, Page 39

TRIED INOCULATION ON YOUR PROBLEMS?

With inoculation, you can cure such iron casting ills as chilled edges and machining difficulties. Improved mechanical properties and more consistent metal in all sections can be obtained. Proper inoculation is beneficial to most gray and ductile cast irons. It is a simple, practical and economical practice.

Ohio Ferro-Alloys produces a number of inoculants for a wide range of irons. To find out how inoculation can help solve your problems, needle our Foundry Service Department.

Standard 75% Ferrosilicon • Calcium bearing 75% Ferrosilicon • Low Aluminum 75% Ferrosilicon • Standard 85% Ferrosilicon • Calcium bearing 85% Ferrosilicon • Low Aluminum 85% Ferrosilicon • Low Aluminum Calcium bearing 85% Ferrosilicon • Calcium Silicon

QUALITY DEPENDABILITY SERVICE

Ohio Ferro-Alloys Corporation
Canton, Ohio

Birmingham • Boston • Chicago • Dayton • Denver • Detroit • Houston • Kansas City • Los Angeles
Minneapolis • Philadelphia • Pittsburgh • St. Louis • Salt Lake City • San Francisco • Seattle • Vancouver, B.C.

READERS' COMMENT

Wrong Impression

To THE EDITORS:

We were somewhat disturbed to see your comments on our AFS paper presented at San Francisco entitled "Minor Elements in Aluminum Alloys for Die and Permanent Mold Castings," as published on Page 154 of the July issue of FOUNDRY.

We believe that to correct the impression in your notes of the harmful effect of zinc, it would be in order to publish the pertinent comments from the paper, with particular emphasis on the fact that zinc contents of up to 3% had no effect on the properties of the alloy either before or after exposure, as follows:

"The principal effect of zinc up to about 3% in aluminum alloys containing copper and silicon is to improve machinability. . . . The recent decision of the ASTM to increase the maximum zinc content of SC84A from 1% to 3% was made after years of exhaustive testing. Under the control of Committee B6, test bars of this alloy with various zinc contents were exposed at two sites; one on the roof of the Port Authority Building in New York City, and the other 800 yards from the sea at Kure Beach, North Carolina. (Summarized in Fig. 2). . . . There was some loss in tensile strength at the Kure Beach location but the New York exposure indicated no effect on tensile strength. At both sites the yield strengths were higher and the elongations lower due to the aging of the alloy. The zinc contents, however, did not affect any changes due to the 6 years exposure as the slope of the curves in every case parallels the curves of the initial properties, and the 3% zinc properties were equal to the 0.5% zinc properties after 6 years. Even the expected severe corrosion of the Kure Beach location was no worse on the high zinc samples than on those with less zinc."

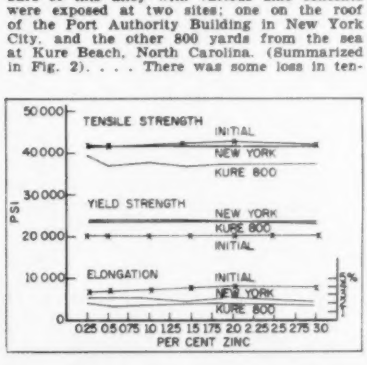


Fig. 2—Chart summarizes results of ASTM tests of aluminum alloy SC84A with various zinc contents

I recall that, in the discussion, Mr. Bonsack pointed out that aluminum alloys with low iron could be die cast under certain conditions and to that extent he disagreed with our comments on iron. There was, however, no disagreement with our comments on zinc, and the questions about zinc simply elicited further information.

As we were the developers of the aluminum silicon copper alloys with higher zinc contents, and as we have taken the lead in their promotion, we feel that the remarks as you abstracted them gave a false impression.

D. L. COLWELL
Vice President

Apex Smelting Co.
Cleveland

Editor's Note: FOUNDRY's resume stated, "Zinc up to 3 per cent improves machinability and yield strength. Tensile strength is not hurt except in marine exposures. Elongation is reduced, but only as a result of corrosion. . . . During the discussion there was some disagreement with the speaker's remarks about the value of iron and zinc in diecasting alloys."

The editors regret the possibility of any misinterpretation of their report as a result of the need to condense the speaker's remarks. Mr. Colwell did mention drops in elongation and effects of corrosion, but the report failed to emphasize his contention that neither was worse in 3 per cent zinc alloy than in 0.5 zinc alloy.

Walter Bonsack, Aluminum & Magnesium Inc., Sandusky, Ohio, in the specific case of iron, stated "Iron lowers properties and raises melting and pouring temperatures, all of which are not desirable."

Walter Sicha, Aluminum Co. of America, Cleveland, asked, "Doesn't zinc do more harm than good?" Our editor took this question as an implied disagreement with the speaker's comments on the effects of zinc in aluminum diecasting alloys.

Finds Many Practical Hints

To THE EDITORS:

Some time ago I sent an inquiry to you on a problem with our centrifugal casting, and your practical suggestions provided the solution.

I think that FOUNDRY magazine is characterized by the column of "Questions and Answers." We find many practical hints in this column which we apply to our operations.

TOHRU TAKI
Metallurgist

Kubota Iron & Machinery Works Ltd.
Osaka, Japan

Increases Plug Life

To THE EDITORS:

In the June issue of FOUNDRY under "Questions and Answers" there was a request for information to help attain longer life in cast iron plugs that eroded when used with molten aluminum.

Here's why AIRETOOL muffled motor grinders boost production...

Available on Airetool Vertical Grinders 600-V and 700-V, the new muffled motor cuts nerve-shattering exhaust noise to a minimum. Operator fatigue is reduced. Grinding efficiency and production go up as the noise level comes down. Muffled motors prove especially effective for assembly line use where hundreds of tools contribute to the general noise.

Test a muffled motor grinder in your plant; Airetool will be glad to demonstrate its effectiveness without obligation. For information on Airetool's full line of pneumatic grinders and production tools, write for Bulletin 70 today.

AIRETOOL MANUFACTURING COMPANY
SPRINGFIELD, OHIO

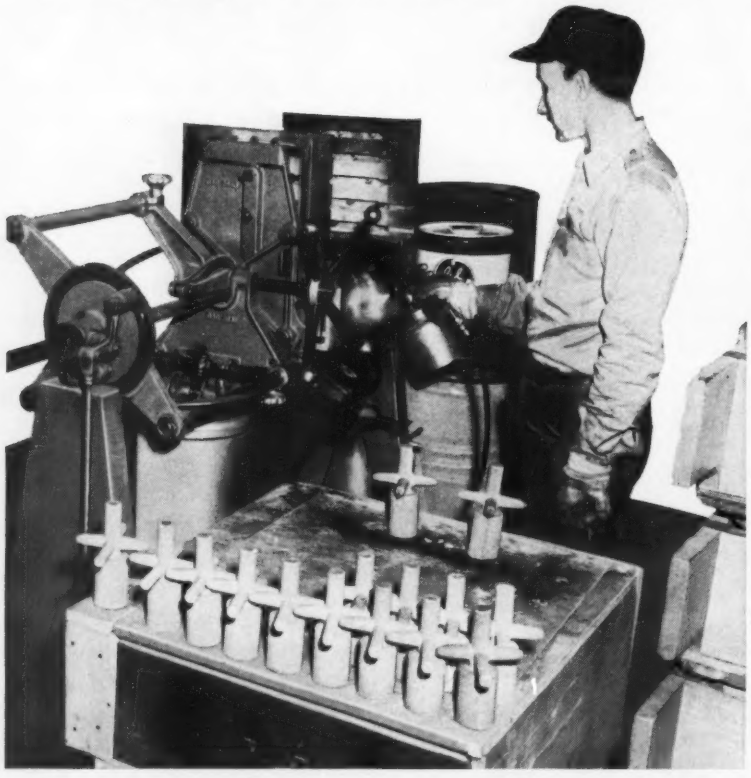
More than 30 years' experience in pneumatic tools

Branch Offices: New York, Chicago, Tulsa, Philadelphia, Houston, Baton Rouge
Representatives in principal cities of U.S.A., Canada, Mexico, South America, Puerto Rico, England, Europe, Italy, Japan, Hawaii
Canadian Plant: Brantford, Ontario
European Plant: Vlaardingen, The Netherlands

For More Information Circle 597, Page 39

SILICONE RELEASE AGENTS FROM STEVENS PROVIDE

perfect separation of shell sands from hot patterns



New, improved G-E Silicone Release Agents from Stevens offer all of the important performance qualities required for the crisp, clean release of shell cores and molds from the hot metal pattern. They assure accurate reproduction of all contours and dimensions and detail, even on the most complex patterns.

Minimum Build-up—there's little or no build-up on pattern surfaces to destroy dimension accuracy.

Chemical Inertness—they do not react with, or dissolve in, resins or binders. Parting film is maintained at all times.

Resistance to Breakdown—G-E Silicone Release Agents, distributed exclusively to the foundry industry by Stevens, do not carbonize at high temperatures.

Rapid, Even Coverage—Easy to apply, they assure rapid, even coverage over all parts of the pattern.

Economical—A single, thin film of greatly diluted emulsion is adequate, even for extremely long runs. Pattern-cleaning operations are kept to an absolute minimum.

See how G-E Silicone Release Agents can improve the efficiency of your shell core, shell mold and hot box operations. Call your Stevens Representative today. Or, write, wire or phone direct to:

frederic b. STEVENS, inc.

DETROIT 16, MICH.

Buffalo • Chicago • Detroit • Cleveland • Milwaukee • Wallingford (Conn.) • Indianapolis • Springfield (Ohio)

The question was very well answered and most of the angles were covered. However, there is one other suggestion that might be worth consideration. Many in the aluminum industry use a protective coating available under several tradenames which is simply the process of cleaning the cast iron well by blasting, spraying a coat of aluminum on the object, using a metal spraying gun, and then baking the object at 1300 to 1500° F for a short time to stabilize the coating. Many firms are engaged in this type of work.

It is believed this type protection will give many times the service of the common sodium silicate mixes. Of course, it does add to the expense of the product as fabricated.

TED HICKOX

726 Carl Ave.
New Kensington, Pa.

Seeks Handbook

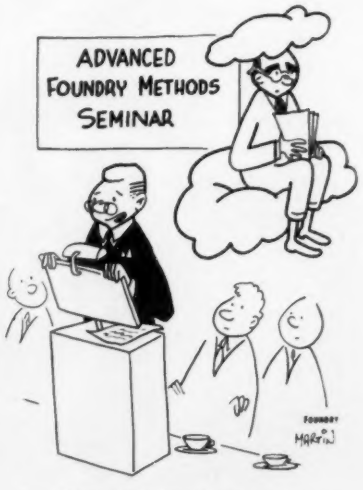
TO THE EDITORS:

Last November we had a fire in our factory which destroyed two offices. I lost my *Foundrymen's Handbook* I had used for many years. Is there any way you might obtain another copy of this book for me?

B. C. FUNK

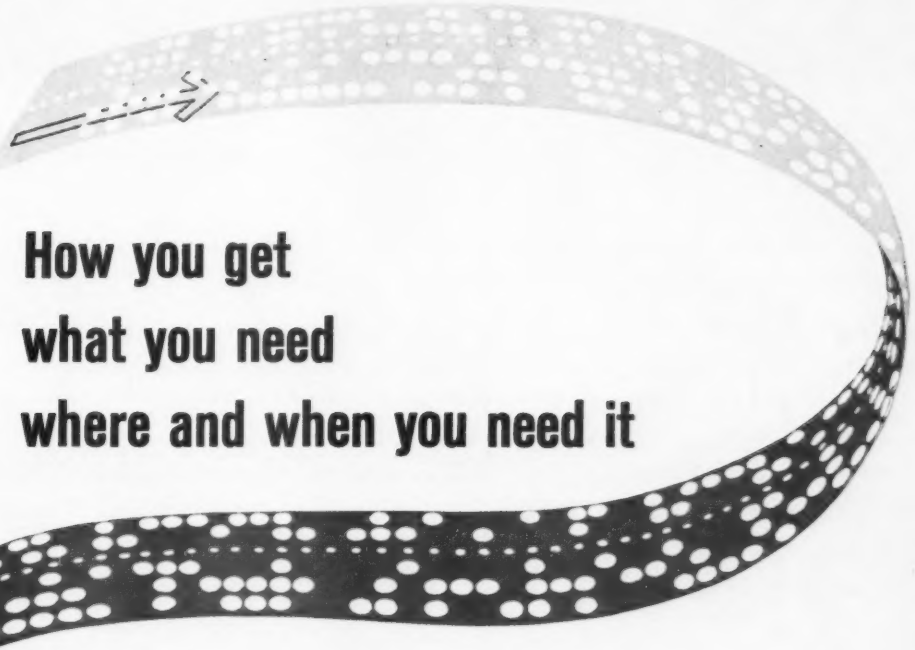
Acme Pattern & Foundry Co.
3405 East Slauson Ave.
Maywood, Calif.

Editor's Note: This book has been out of print for many years. Perhaps some reader has a copy he would care to dispose of.



"Now, let's hear from our research and development section"

ANOTHER NORTON PRODUCT



How you get what you need where and when you need it

Suppose you need a shipment of Behr-Manning coated abrasive belts or discs in a big hurry. Time, profit, your customer's goodwill at stake.

You get them for sure . . . with the help of our high-speed electronic processing of orders. Behr-Manning fights to give you service. Maintains warehouse branches in your area (with methods rooms and engineers to help you). Plus the finest group of industrial distributors anywhere.

Service you get—quality too, as in Resinall® belts and discs. They get more work out. They're better . . . because we devote more men, facilities and resources to coated abrasive research and development than anyone.

BEHR-MANNING CO., Troy, N.Y., a division of Norton Company.

BEHR-MANNING
Abrasive Service

For More Information Circle 599, Page 39

The Deming Company Reports on Shalco Shell Core Molding:

"A Vein-resistant Core Every Two Minutes... for 52% Less!"

There is good reason why The Deming Company, Salem, Ohio, considers two Shalco U-180 Shell Core Molding Machines an extremely sound investment; Assistant Plant Superintendent Jack Kerr puts it this way:

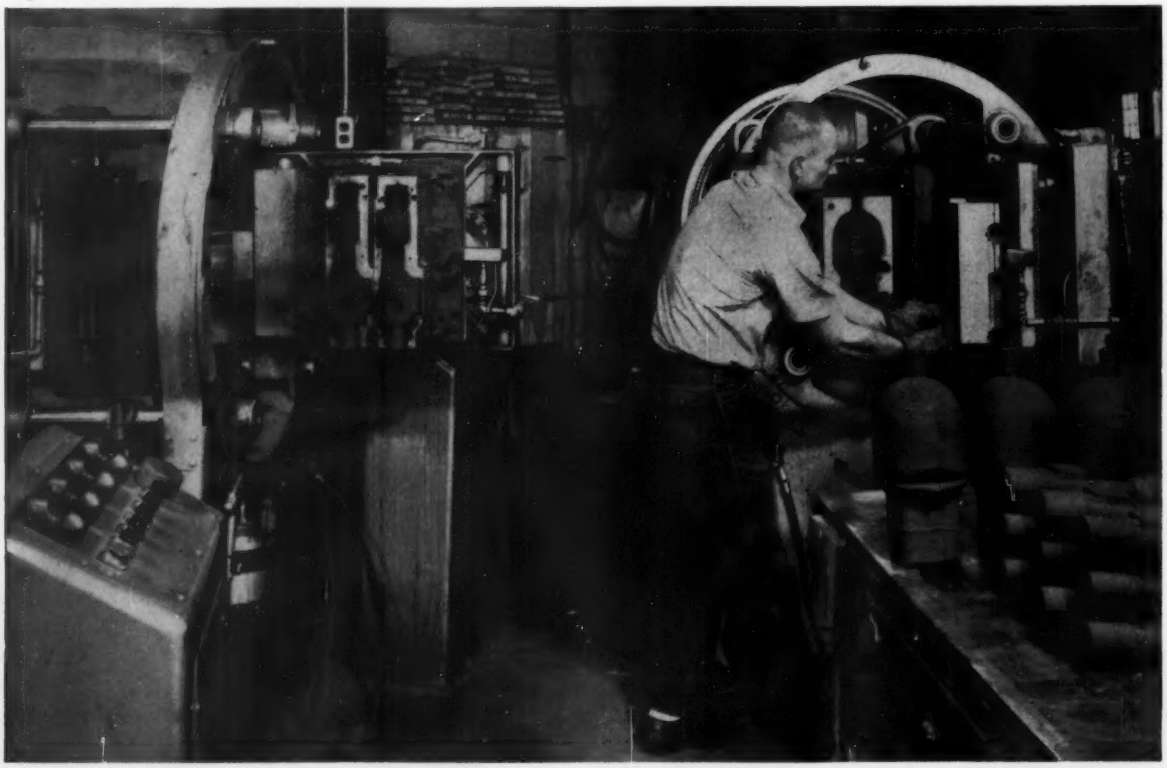
"In the last two years, we converted over 65 jobs to our Shalco machines and, as a result, saved money and increased product quality. For example, take one of our centrifugal casing cores that we used to make in halves with bench core makers. On the Shalcos, we eliminate pasting and sealing operations plus a two hour drying cycle . . . get a vein-resistant core every two minutes for 52% less. On the average job transferred to the Shalcos, we increase production 41% and require but ⅓ as much handling time. What's more, Shalco cores have far greater storage life than oil and sand cores and less moisture-drawing tendencies. There is also an average 10% savings in material."

Consider carefully what savings like those realized by The Deming Company could do for your profit picture. Then, call, write or wire for complete information.

Shalco Division of
National Acme
THE NATIONAL ACME COMPANY
173 E. 131st STREET
CLEVELAND 8, OHIO

Sales Offices: Newark 2, N. J., Chicago 6, Ill., Detroit 27, Mich.
Licensee in the United Kingdom: Stone-Wallwork, Limited, London SW-1, England

At The Deming Company, well-known manufacturer of "Pumps for all uses", one man operates two Shalco U-180's; produces top quality shell cores like those on the table.



WHEREVER METALS ARE CAST... FOUNDRY
SEPTEMBER 1961

Comply or Quit!

Some enlightening information on application of specifications for gray iron castings, and the extent to which these specifications are observed by foundries, was developed by a recent study conducted by a committee of the American Society for Testing and Materials (see Page 121).

This study shows that although ASTM specifications are the principal ones requested by users of gray iron, more than 60 per cent of the foundries concerned with this survey are asked to meet private specifications of some customers.

About 12 per cent of the foundries reported that no specifications are applied to the castings they sell. Apparently the customers of these foundries assume that they will be supplied sound castings of reasonably uniform hardness and strength; or they feel that the experience of their previous dealings make it unnecessary to spell out their exact requirements in terms of physical or chemical properties.

Certain private specifications have been created for no apparent reason; they offer no more protection to the user than would standard specifications, and they are more difficult and costly to meet. Foundries have an educational job to do with consumers in seeing that specifications which add appreciably to production costs are applied only when necessary—and that when they are required, the foundry is adequately reimbursed.

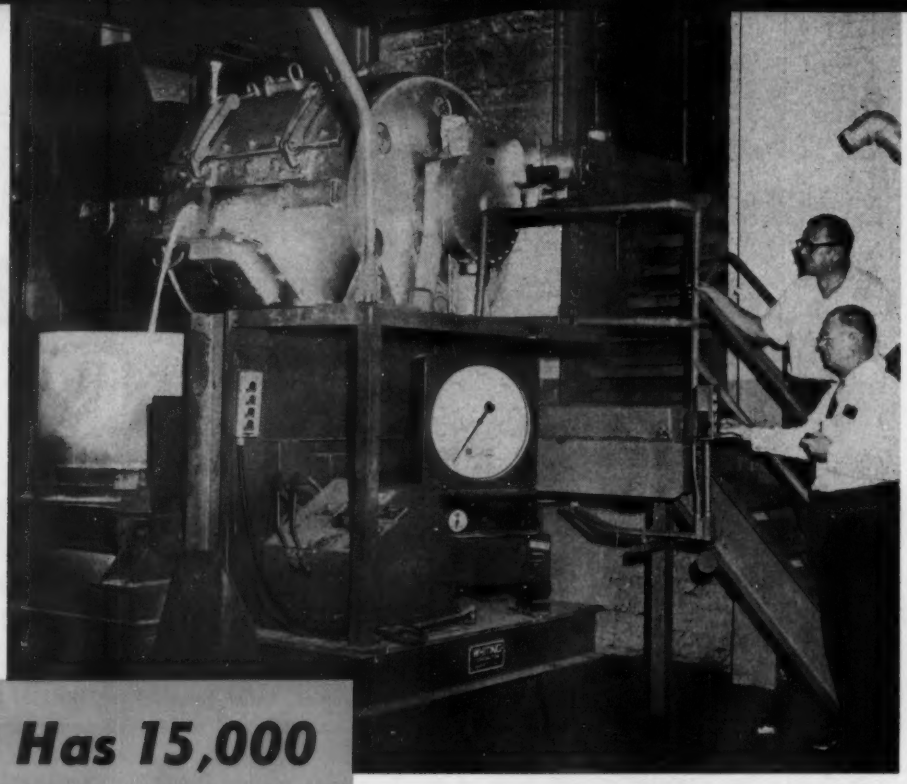
A more disturbing disclosure of the ASTM survey is the apparent negligence of many gray iron foundries to perform the tests called for under an applicable specification. About one-third of the responding foundries said that they make none of the mechanical tests called for by ASTM specifications even though the castings they deliver are supposed to meet those requirements.

The extent to which this situation is duplicated among producers of other types of castings is unknown. Nevertheless, it is something which can have an important influence on the welfare of the foundry industry. It should be obvious that strict and universal adherence to the specifications requested by castings buyers automatically would upgrade the average quality of the industry's product.

At the same time, the foundry that is unable or unwilling to meet the reasonable demands of customers eventually must default to a more astute competitor.

William G. Bude

Editor



Ronald McMillan, works manager, pushes button to start pour of base iron from the receiving ladle into treatment ladle as Walter Tragarz, general foundry superintendent, watches

Harvester Has 15,000 Ton Capacity at New NODULAR IRON

International Harvester Co.'s recently opened nodular iron foundry at its Memphis, Tenn., works may be world's largest devoted exclusively to nodular iron production. Capacity is 15,000 tons per year, and the plant features tight controls and automatic operation

By JACK C. MISKE
Associate Editor

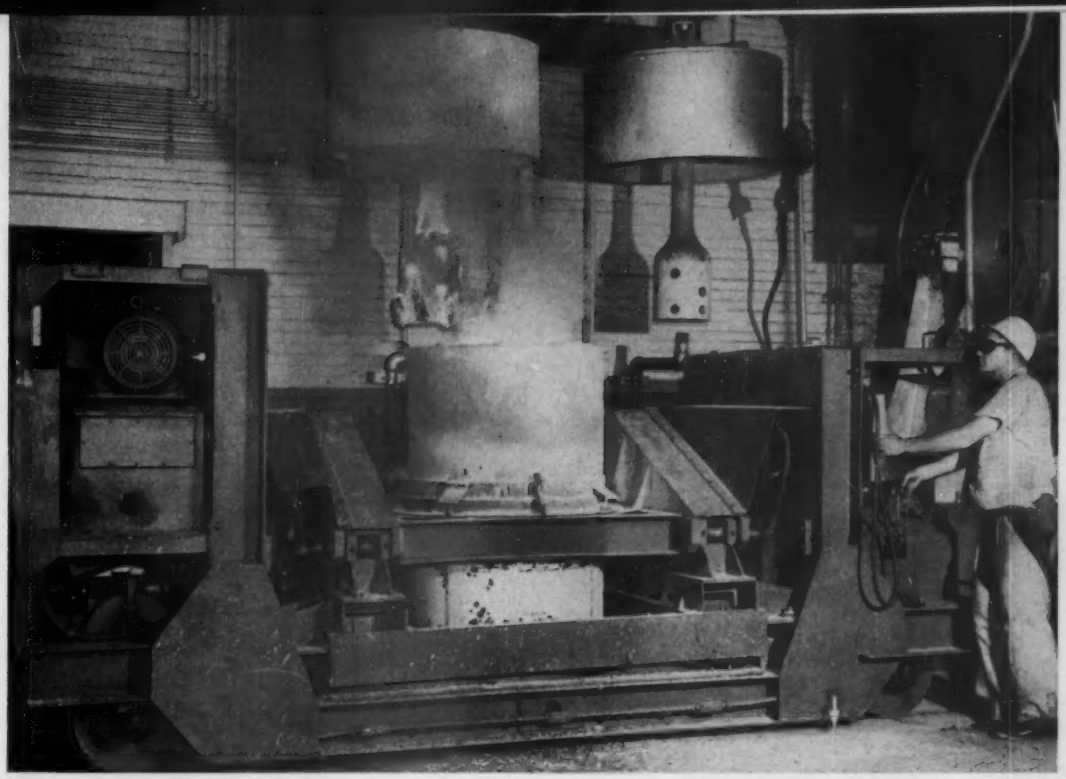
● NODULAR IRON is coming of age, and the new nodular iron foundry at Memphis Works, International Harvester Co., Memphis, Tenn., is a sign of that maturity. Perhaps the largest exclusively nodular iron foundy in the world, it contains 196,000 sq ft of operational floor space and currently has a capacity of 15,000 tons per year.

Originally completed in 1948 as a gray iron foundry, it underwent a year-long conversion and renovation program and reopened just a few weeks ago as the source for all of the company's nodular iron castings in sizes from a few ounces to about 350 lb. The new facility will produce nodular iron in three grades, 100-70-03, 80-55-06, and 65-45-15.

Harvester has been working with nodular iron since 1953 and last year used 9500 tons of such castings in its products. Before its conversion, the Memphis foundry itself several years ago reached a maximum of 40 tons per day at the same time that it was pouring over 100 tons of gray iron daily.

Designed for the sole purpose of producing nodular iron castings efficiently and economically, the new foundry features tight controls, mechanization, and automatic operation adapted to both long and short-run production. Employment now totals 275 and may reach about 450 eventually.

Molding Sand Preparation—Two sand systems are maintained, one for the slinger line on which larger molds are made, and the other for matchplate and cope and drag molding. Sand for the larger castings requires a little more strength than



Treatment ladle has 4000-lb capacity and is mounted on a car on tracks. In this view, plunger has risen automatically after completing inoculation of base iron

FOUNDRY

the others. Sand mixes on each line also vary somewhat with the types of castings being produced each day.

A typical mix for the slingers contains lake sand of 55 fineness, 8 to 10 per cent bentonite (both southern and western, with more western added as greater hot strength is needed), 3 per cent moisture, and about 8 per cent seacoal.

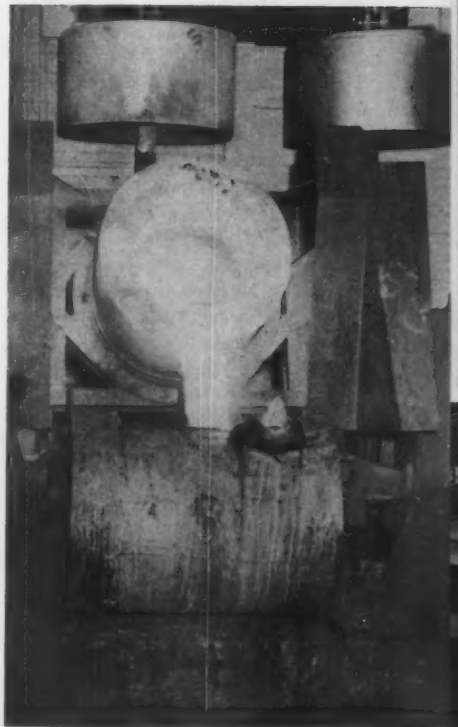
For the smaller castings, the base sand is a bank type, 80 fineness, with 3 per cent clay. Other ingredients are the same as in the mix for larger castings.

Like almost all departments of the foundry, sand preparation features automatic operation. Automatic equipment weighs the sand, makes bentonite additions in the proper proportions and amounts, checks moisture content, adds water as needed, and mulls the mixture. The operator's only function is to act as an observer to insure that the equipment is functioning properly.

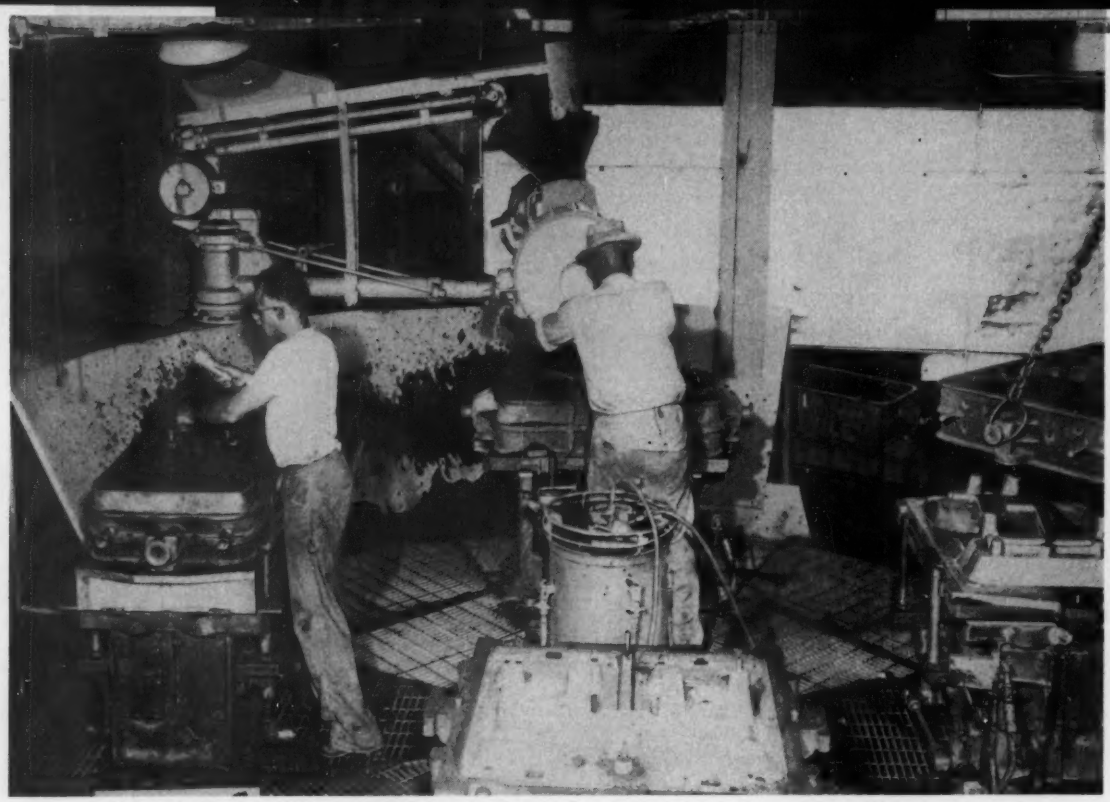
The slinger system mix is stored in two 65-ton bins and one 20-ton bin, the other in three 65-ton bins. Prepared sand is distributed from bins by belt conveyors, and sand automatically is plowed off into hoppers at the molding stations as need for it is indicated by probes in the hoppers.

Cores — Core sand is a pure, washed, rounded-grain silica of 65 fineness. It comes into the plant in gondolas and is stored in three 700-ton bins. As it is needed, it is clamshelled into a 30-ton bin from which it goes into a dryer at the rate of 6 tons per hour. Dried sand is stored in three 90-ton hoppers from which it is drawn out automatically by belts into two 8-ton hoppers over the mixing area.

Mixes are prepared automatically



Treatment ladle pours 1500 lb of nodular iron at 2800°F into transfer ladle mounted on an electric truck



Molds for large castings are made on a slinger line. One machine makes drags, the other copes. Four patterns are mounted on a turntable at each slinger

in 1000-lb batches. All dry ingredients are weighed, and water and oil are added by the gallon. A typical mix contains 1000 lb silica sand, 16 lb corn flour, 10 lb iron oxide, 3 to 3½ gal water, 8 qt oil, and 1 qt release agent.

Prepared batches move by monorail into hoppers over the coremaking machines. These consist of 15 units of different sizes, including a number of bench-type blowers. Cores range in size from a few ounces up to 40 lb. Some large cores up to 120 lb are made on rollovers. All cores are set by molders.

Melting — At the heart of the foundry's nodular iron production are two basic cupolas. Both are unlined, externally water cooled, and equipped with hot blast. Wells are lined with carbon block. The smaller is 57 in. in diam and has a capacity of 63 to 87 tons per 8-hr shift. The larger is a 72-in. unit capable of melting 106 to 138 tons per shift. At the moment, with the foundry being brought up to full production gradually, only the 57-in unit is operating, producing about 10 tons per hour. It's in daily use, and the bottom is dropped each evening.

Cooling water—about 350 gpm—is reclaimed, cooled in a tower, and reused. The cooling permits modifications of melting conditions from acid to basic or any point between.

The hot blast system preheats air for combustion to 600° F, and the moisture in the air is controlled to provide control of melting and carbon content and to eliminate variables in operation. Tapping temperature is maintained at about 2850° F. Molten metal flows from the cupola into a 6-ton receiving ladle.

Charges consist of 2200 lb of metal, consisting of steel scrap, 40 per cent returns, and 6 per cent silvery pig; 340 lb coke; 110 lb limestone; and 40 lb fluorspar. They are made up on a four-stage, merry-go-round charging unit. Quantities of each material are weighed and are controlled within a fraction of a pound.

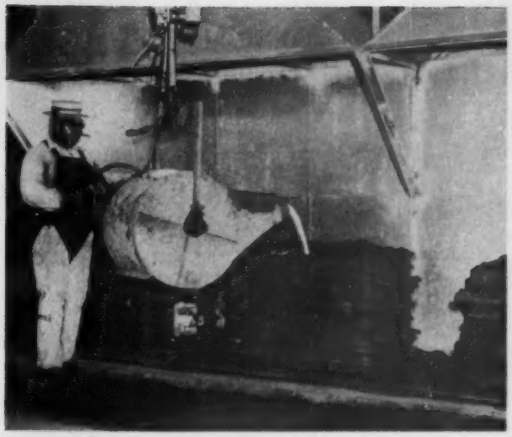
Slag is carried off in running water, which granulates it. A bucket elevator delivers the granular material to a hopper, from which it is removed daily by truck. No manual handling is involved.

Inoculation—Each of the cupolas is served by its own treatment unit, which consists of a car-mounted ladle equipped with a scale. The receiving ladle is tilted to pour 3000 lb of molten base iron into the treatment ladle, and the entire unit, which is on tracks, then is moved to the side to its treatment station.

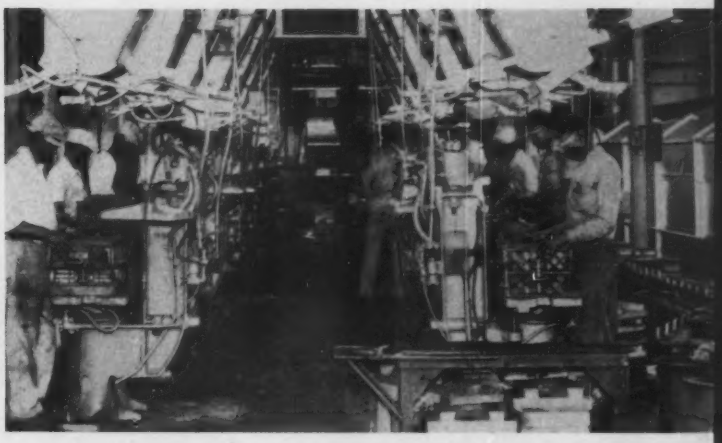
At that point, a heavy lid is lowered to cover the treatment ladle, and a ceramic plunger attached to the lid submerges 38 lb of magnesium alloys in the molten iron. This method insures proper mixing of alloy and iron and minimizes alloy loss. The plunging cycle is controlled by an automatic timer, and scales on the treatment unit are consulted to insure that the metal has been treated correctly.

After inoculation, enough ferrosilicon is added to bring the silicon content up 3 points. This addition is made as 1500 lb of metal is poured into transfer ladles on electric trucks. The treatment ladle is tilted to accomplish this pouring. The trucks then distribute the inoculated iron to the pouring stations. Molds are poured from ladles which move on overhead monorails and are raised and lowered electrically. All pouring stations are hooded.

Molding—Large castings—up to about 350 lb and 56 in. long—are molded at a four-station sandslinger unit. Two slingers are employed, one for copes and one for drags, and each operates with a turntable on which four patterns are mounted. About 450 molds per shift are



Pouring ladles move on overhead tramrails and all pouring lines are hooded. This line is for molds made by the slingers



On molding lines for smaller castings, each station is equipped with 3000-lb capacity sand hopper. The mold conveyor lines vary in length

produced on the slinger units.

A continuous-car mold conveyor serves this unit, and provisions have been made to allow added cooling time for heavier castings in which the structure would be affected adversely if they were shaken out in the conveyor's normal cycling time.

An intermediate unit consists of six jolt-squeeze molding stations, each provided with a 6000-lb molding sand hopper. Molds are placed on a conveyor which is made up of 105 pallet cars 27 x 44 in. and are moved on it to the hooded pouring line. Each station produces 325 to 500 molds daily, depending on casting size and number of cores to be set.

After they have been poured, molds spend 27 minutes in a hooded cooling area, then are dumped automatically onto the shakeout. Castings are separated from the sand and fall into one of 55 drop-bottom baskets hung on a casting cooling conveyor chain about 160 ft long. This chain conveyor also carries 216 hooks on which large castings from the slinger line are hung. All castings are carried to the cleaning room.

Three squeezer units for smaller castings are composed of two conveyor lines each, with six molding stations with 3000-lb-capacity sand hoppers on each line. These lines vary in length to provide different cooling times for castings before shakeout.

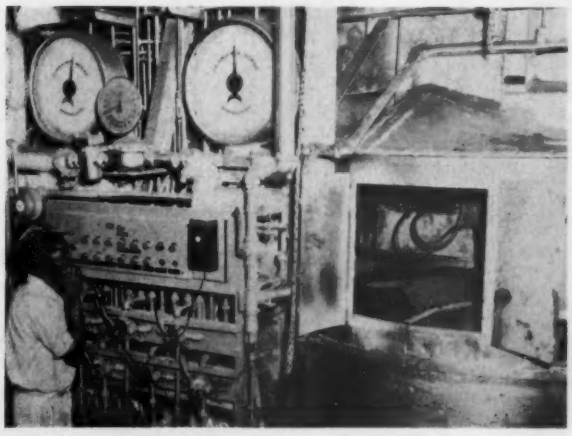
Lines 1, 2, and 5 are 452 ft long and are made up of 113 pallet cars each. Line 6 is 468 ft long and has 117 cars. Lines 3 and 4, which are primarily for light castings, are 232 ft long with 62 cars each. Each line can be operated at speeds varying from 7 to 28 fpm. All run through hooded cooling areas and are shaken out automatically. Minimum cooling time is 20 minutes.

Cleaning — Castings from these lines emerge from shakeout onto a belt conveyor 76 ft long on which they are sprued. Five cutoff machines handle sprues which can not be removed with a hammer.

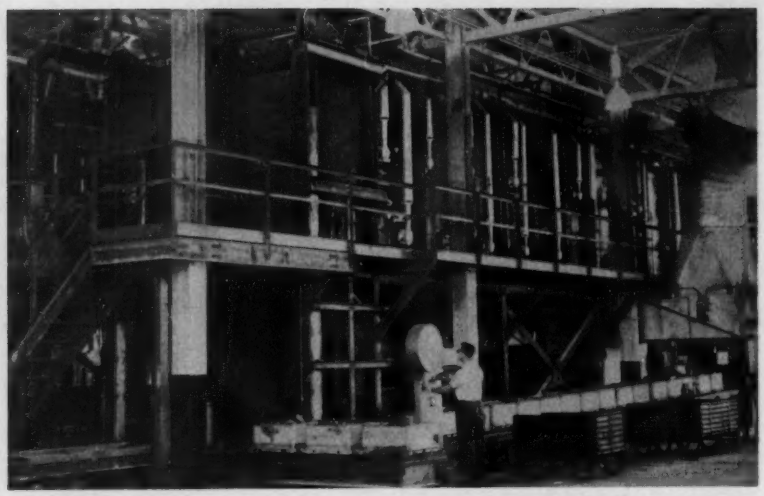
Sprued castings are placed on a conveyor which delivers them to a continuous shot blast cleaning unit with a capacity of 9 tons per hour. They emerge from the shot blast machine onto another conveyor which takes them to a mezzanine floor over the grinding area.

On the mezzanine, castings are

Molding sand is prepared automatically. Two systems are maintained.



Small castings are cleaned in continuous shot blast unit with 9-ton capacity per hr



Two gas-fired, elevated furnaces are used for both two-step normalizing and full annealing. They are 54 ft long and 9 ft 8 in. wide

sorted into 30 storage hoppers which feed by gravity to the grinding stations below, at ground level. Castings are ground on 15 high-speed, double-ended grinders of various sizes.

Large castings entering the cleaning area on the chain conveyor hooks described earlier are taken off, sprued, and hooked onto a line leading into a cabinet-type airless blast cleaning machine. When they emerge, they are deposited on an automatic conveyor, and chipping and grinding are completed. Two swing grinders also are available for use as required.

After cleaning, all castings are trucked from the cleaning area to the heat treat furnaces.

Heat Treating — Three types of heat treatment are employed to produce the three grades of nodular iron produced by the foundry. These include normalizing with an air quench for the 100-70-13 iron; two-step normalizing for the 80-55-06 iron, and a full anneal for the 65-45-15 iron. Four new gas-fired, continous-type furnaces are used to perform these treatments.

Normalizing is accomplished in a direct-fired furnace 9 ft 8 in. wide and 25 ft 6 in. long. It has four zones and holds 30 trays 30 x 33 in., in rows of three each. A 29½ x 29½ x 12 in. box of castings is bolted onto each tray. Castings are heated to 1600° F, held at that temperature for about two hours, cooled to a slightly lower temperature, and air quenched in a soft blast of air.

Two-step normalizing is achieved in two elevated, radiant-tube furnaces, each of which is 54 ft long and 9 ft 8 in. wide. They accommodate 60 boxes and trays, also in rows of three each, of the same size as those used in the direct-fired normalizing furnace. These units have four zones, and a nitrogen atmosphere is maintained throughout both furnaces, which also include air quenching facilities.

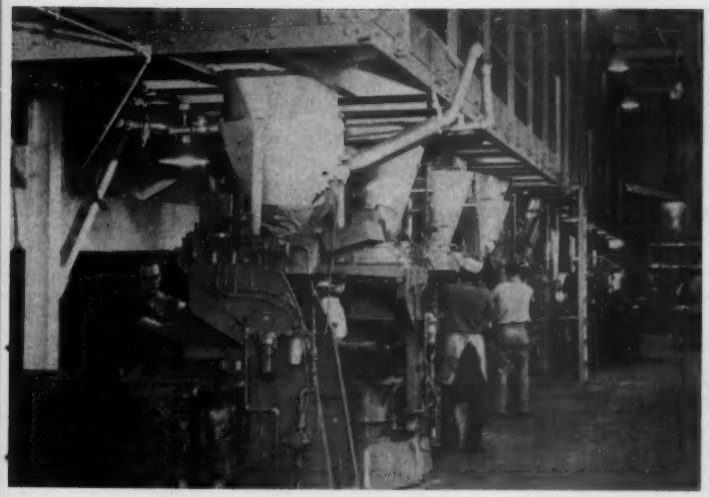
The two-step normalizing consists of heating castings to 1600° F, holding them at that temperature for two hours, cooling them to 1425-1435° F, holding them at that temperature for about three hours, and air quenching.

The same two units are used for full annealing. Castings are heated to 1600° F for about two hours, furnace cooled to 1300° F for three hours, and air cooled.

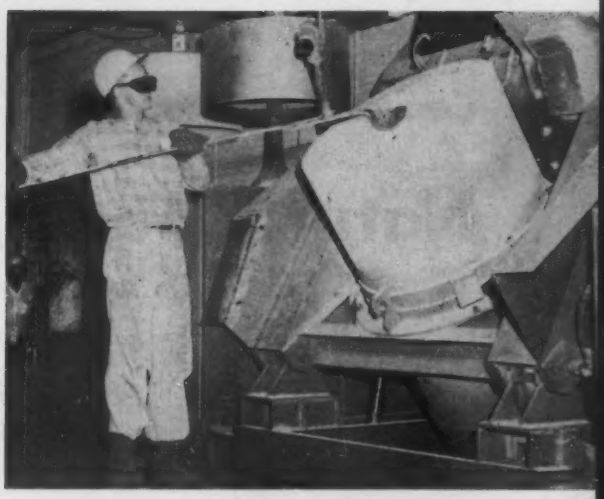
The fourth furnace is a batch-type unit for experimental and low-production jobs. It is 3 ft 11 in. wide and 8 ft 4 in. long. This unit is atmospherically controlled and holds three boxes and trays of the same size as the others.

Straightening and Painting — If castings require straightening after heat treatment, 600-ton and 250-ton straightening presses are available.

Yard crane dumps coke. Note that the coke is brought into the plant in containers which can be lifted easily by the crane



Oil-bonded cores ranging up to 40 lb in weight are produced on 15 machines of various sizes



Iron sample taken from treatment ladle will be checked for nodule formation

About 25 per cent of the castings are sealed. They are processed in a dip tank which holds 500 gal of sealer paint. Final step in the handling of castings is to weigh them on print-record scales as they go to the loading docks, which are equipped with mechanical levers.

Laboratory Facilities — Chemical, metallurgical, and physical testing laboratory facilities maintain constant checks on foundry processes and on finished castings. Incoming materials also are examined to determine their conformity to specifications.

Base iron from the cupola is analyzed completely every hour, and high-speed determinations of carbon and sulfur contents are made two or three times an hour. Temperature of molten metal as it leaves the cupola is taken every few minutes with an optical pyrometer.

After every ladle of base iron has been treated with magnesium alloy, a sample is examined to check nodule formation. Test bars are cast to determine physical properties such as hardness, tensile strength, yield strength, and elongation.

Quality Control—Continuous inspections at each stage of the casting process are supplemented by final examination to assure adherence to dimensional and surface quality requirements. Brinell hardness tests, x-rays, and sonic testing are performed, and statistical quality control methods are employed.

Working Conditions—An extensive and efficient system of air intakes and exhausts, carried over from the gray iron foundry, makes a valuable contribution to the comfort of foundry workers.

In the cleaning room, 119,500 cfm of air is exhausted, and 151,200 cfm is supplied, for a total of 10 complete changes of air per hour. In the core department, 50,776 cfm of air is exhausted, and 86,400 cfm is added, to make 8½ air changes per hour. In the foundry proper, 374,720 cfm of air is exhausted and 433,600 cfm is supplied, changing the air 13.4 times every hour.

Every effort is made to maintain efficiency and safety through good housekeeping, and the entire foundry operation is clean and uncluttered. Employees wear safety shoes and asbestos clothing as their jobs require them, and wearing of safety glasses or goggles is a condition of employment.

Patterns—With the exception of a few wood patterns mounted on boards for short-run or prototype work, only metal patterns are used. The foundry has its own pattern shop, which includes 12 patternmakers and 6 other men who do flask and pattern repair and setup work.

● For an extra copy of this article, until supply is exhausted, use card on Page 39

Castings are sorted into 30 hoppers which feed by gravity to 15 high-speed, double-ended grinders below

Converting from

Natural Sand to Synthetic Sand

Modern foundry practice requires close production controls. In revamping its control program, this foundry looked first to its sand system

By ANDRE HERRAULT and HARRY HERON
Plant Engineer *Foundry Superintendent*
Burndy Corp.
Norwalk, Conn.

● SAND is a vital, if temperamental, variable which foundrymen have treated with either artistic reverence or total indifference. Of all the important variables in the foundry operation, molding sand is one of the most critical.

During the past twenty years many developments have taken place within the foundry industry. As part of this reawakening, the U. I. Division of Burndy Corp., Norwalk, Conn., has embarked on a program of firmer controls for foundry operating procedures. Holding top priority in this program is conversion from a natural sand to a synthetic sand system.

To smooth the way for the introduction of these new procedures at Burndy, all production people involved were briefed carefully well before the project began. Once their co-operation and confidence were secured the project moved ahead readily. We obtained consultative help from our sand supplier and moved ahead carefully in the sand conversion program, avoiding quick, possibly ineffective remedies.

Mechanized System—The foundry sand system at Burndy is mechanized, having a 35-ton storage hopper which batch loads a 1500-lb capacity muller. It unloads conditioned sand to a bucket elevator which feeds a conveyor for distributing prepared sand to eight, 2-ton molding hoppers. A return conveyor under the shakeout grate delivers sand to a bucket elevator, which empties on a vibrating screen over the 35-ton storage hopper.

We know that natural sands under the best operating conditions are a difficult molding material to control. As mined, the ingredients of this material vary. Consequently, the characteristics of natural sand vary. That complicates the problem of sand control.

Our conversion program involved introducing synthetic sand into an existing natural sand system while maintaining tight control, and without disrupting production. The following conversion procedures detail a number of possibilities which were considered and include our reasoning for selecting one of these procedures.

When we discuss percentage of conversion, we are indicating per cent by weight of preconditioned synthetic sand added to the natural sand system. As we have noted, the system contains 35 tons of sand, with the balance maintained by removing from the total any excess over the normal loss of 1400 lb per day. This means that when introducing 2800 lb (4 per cent conversion rate) of preconditioned synthetic sand to the system we would have to remove and discard 1400 lb of molding sand during that specific day's operating cycle.

For the type of work produced in the Burndy foundry, covering a broad range of copper and aluminum base alloys, the grade and type of sand chosen was a clay-free, subangular Superior AFS 150 sand.

Here, in step by step form, are the four basic approaches considered for the program, including 2, 4, 50, and 100 per cent conversion changeover rates:

Two Per Cent Rate—Add Superior AFS 150 sand at the rate of 1400 lb per day. This is the normal sand replacement procedure for our existing sand system. Add 64 lb southern bentonite to the 1400-lb batch of Superior AFS 150 sand. Mull the mixture for 10 minutes and add 3½ to 4 per cent water. This mixture will be prepared the night before, for the following day's operation.

On the following day, 14.4 lb of the premixed sand will be added to each batch of sand mulled. This premixing of the additives will remove the likelihood of clay-balling and permit homogeneous distribution of clay and sand throughout the system. When 50 per cent conversion has been realized, it will be feasible to go to the regular 1½-minute mulling cycle.

Sand characteristics for moisture, permeability, green strength, and mold hardness are plotted in Fig. 2. Follow-up of this information is essential to observe sand variations and any resultant undesirable features. No adjustments are made to the system without first contacting our consultants and the methods engineer.

Every Monday, 3- to 4-lb sand samples are sent to our sand supplier for analysis. Data from the sand analysis will be used to verify

the validity of our own recorded data, and also to determine the accuracy of our per cent time curve table, Fig. 1.

At the 50 per cent changeover conversion period, the moisture should read between 4 to 4½ per cent throughout the sand system. If the moisture readings are too high and a decrease in green strength is noted, no additional clay should be added to bring up the strength. Instead the moisture should be lowered.

At the 50 per cent changeover conversion period, if slight expansion defects such as rat tails are present in the castings, 0.03 to 0.05 per cent wood flour should be added to the daily mix.

Four Per Cent Rate—The method of converting at this rate will be the same as for the 2 per cent conversion rate except that the total time of conversion will be decreased by 77 working days.

The only difference in this changeover procedure is that 2800 lb of synthetic sand will be introduced into the system, and 1400 lb of old sand will have to be removed and discarded daily.

Fifty Per Cent Rate—This procedure of conversion will be the same as for the 2 per cent conversion rate except in the removal and disposal of 17½ tons of old sand and preparing 17½ tons of synthetic sand to replenish the system. Preparation of the new sand requires two days' time.

Upon discussing this conversion possibility with our consultant, we are of the opinion that had we taken this action, we very likely would have been initially out of control. Consequently, we did not consider this as an effective alternative approach.

The 100 Per Cent Rate—Clean out complete system of Albany No. 0 natural sand. Process 35 tons of synthetic sand with addition of 6½ per cent southern bentonite, ½ per cent wood flour, and 4 per cent water. Mull each 1200-lb batch for a three-minute period.

Prior to operating the foundry the sand should be processed and mulled through the system for a period of two days. All sand characteristics such as per cent moisture, permeability, and green strength should be charted. These readings and plottings should be carried out after the first half day's operation and will be repeated on the hour for the full two days of the sand preparation cycling.

Evaluation—Three similar castings were taken from production

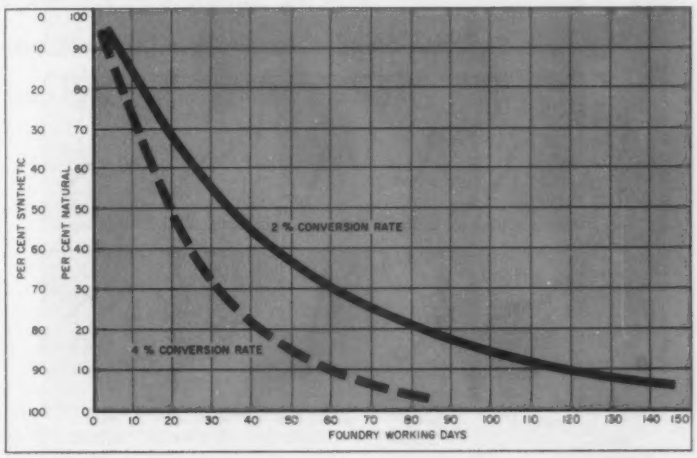
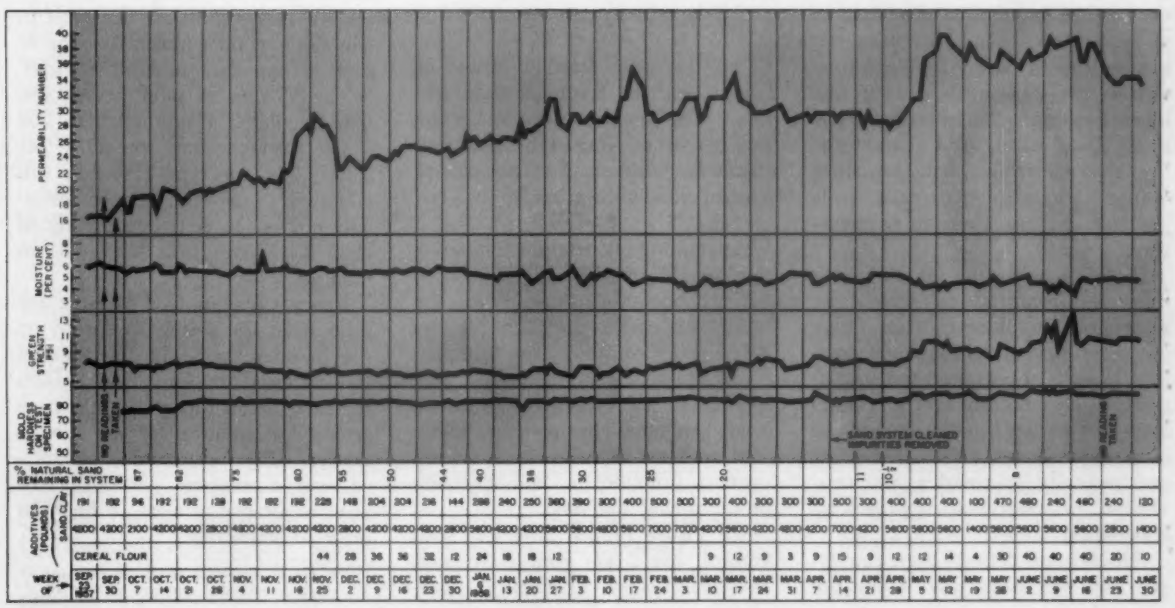
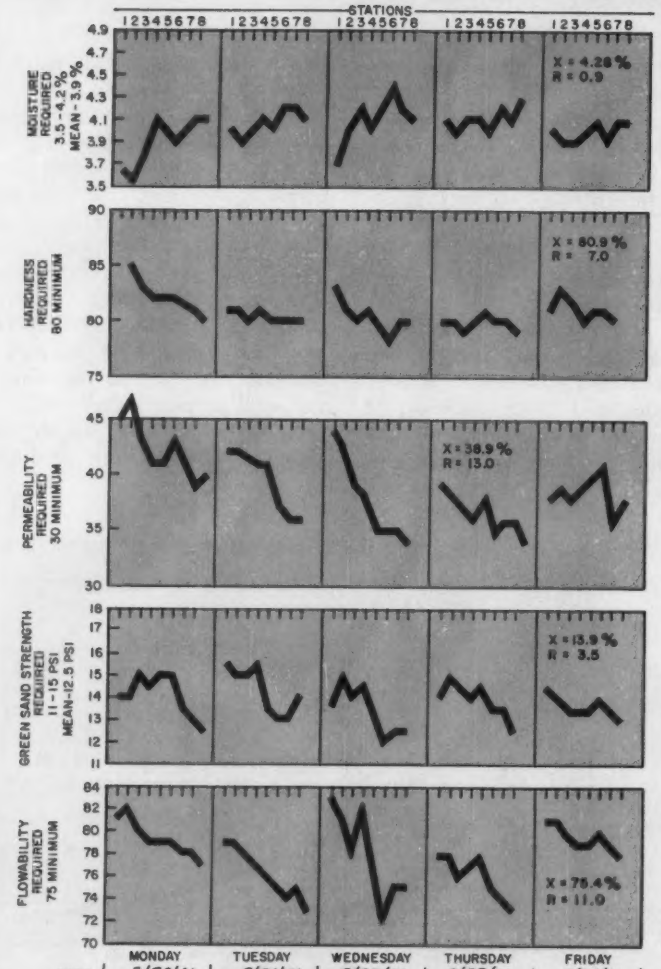


Fig. 1—Chart shows the progress of conversion from a natural sand to a synthetic sand system at 2 and 4 per cent rates

Fig. 2—Sand conversion control chart. With such a chart, the foundry kept track of important sand properties during the conversion period




STATIONS
12345678 12345678 12345678 12345678 12345678
MOISTURE REQUIRED 3.5 - 4.2 % MEAN - 3.9 %
X = 4.28 %
R = 0.9
HARDNESS REQUIRED 80 MINIMUM
X = 80.9 %
R = 7.0
PERMEABILITY REQUIRED 30 MINIMUM
X = 38.9 %
R = 13.0
GREEN SAND STRENGTH REQUIRED 11 - 15 PSI MEAN - 12.5 PSI
X = 13.9 %
R = 3.5
FLOWABILITY REQUIRED 75 MINIMUM
X = 75.4 %
R = 11.0

DATE	MONDAY 2/20/61	TUESDAY 2/21/61	WEDNESDAY 2/22/61	THURSDAY 2/23/61	FRIDAY 2/24/61
BATCHES PER DAY	150	140	120	130	150
ADDITIVES: WOOD FLOUR	18#	17#	None	8#	18#
S. BENTONITE	80#	75#	None	35#	80#
NEW SAND	1400#	1400#	None	500#	1400#

NOTE: "X" INDICATES MEAN AVERAGE OF THE SPECIFIC CHARACTERISTIC FOR THE WEEK.
"R" INDICATES THE DIFFERENCE BETWEEN THE LOWEST AND THE HIGHEST READINGS FOR THE SPECIFIC CHARACTERISTIC FOR THE WEEK.

Fig. 3—A week's record of sand properties. Every hour, sand from one of the eight molding stations is checked

lots each week during the sand conversion project. Each casting was labeled with the following information: Date taken, sand characteristics, type alloy, and melt procedure —that is, gate to ingot ratio, melt temperature, and pouring temperature.

In this manner we maintained a reference library from which we were able to observe what effect the sand system had on our castings in both appearance and soundness. The nature of the results were not linear, but the rewards of our efforts were very satisfactory and radically improved as our conversion program was approaching completion.

The 50 and 100 per cent conversion rate procedures were found not to be the most feasible means of introducing the synthetic sand system. The foundry operation is the nucleus of an important phase of Burndy's business, and no out of control possibilities could be tolerated.

Attempting a complete conversion would have taken a week or two of operation time before the sand was conditioned to give the best casting results. This time factor would exist regardless of the premixing of the synthetic sand, as heat generated by pouring metal into sand molds evidently is an important function in homogenizing or tempering the sand.

To insure proper direction with control, the 2 per cent conversion rate was chosen to start the program. After six weeks, we re-evaluated our position and considered the possibilities of changing to the 4 per cent conversion rate to expedite and complete the project.

Slight adjustments had to be made to balance fluctuations indicated by our sand characteristic curves. Otherwise, the formula we had developed worked extremely well.

The Synthetic Sand—The present synthetic sand system consists of Superior AFS 150 clay-free, washed and dried sand, 6½ per cent southern bentonite, ½ per cent wood flour, and 3.5-4.2 per cent water. Batches of approximately 1200 lb are mulled 1½ minutes. The bentonite addition is 9 oz per batch; the wood flour addition is 2 oz.

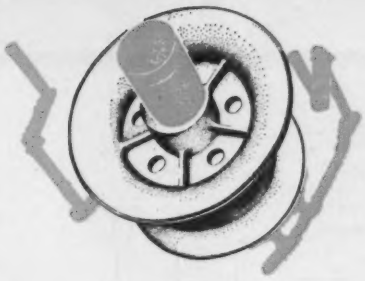
The water addition depends on the sand temperature and on the particular job being run at a specific molding station. We are able to control this factor and still maintain between 3.5 to 4.2 per cent average moisture content within the total system.

Sand characteristics are recorded on the chart shown in Fig. 3. Initially, four daily, random, hourly checks were made at each of the eight molding stations. This was done until our sand-handling techniques were working in a satisfactory, controlled manner. This occurred after operating for approximately two months. At present, one random hour check is made at each of our eight molding stations.

The 35 tons of sand in our system circulates a minimum of five times through the operation per shift. For our type of work, this is found to be the balance which will produce a complete mixing of sand ingredients in a homogeneous manner.

Every three to four months the sand from the system is spread on the foundry floor. In this manner the material is air dried. Then the sand is run through a fine mesh screen for removal of all foreign matter. This procedure is conducted over a weekend permitting the sand to air dry at least 16 to 20 hr prior to screening.

● For an extra copy of this article, until supply is exhausted, use card on Page 39



RISERING

Permanent Mold Aluminum Alloy Castings

Risers in permanent molds act as vents for the mold cavity as well as supply feed metal. Riser, ingate, and nozzle relationships are discussed. A redesigned gating system is suggested

By GEORGE A. BIER
Polymet Co., Orange, N. J.

● RISERS in permanent molds for aluminum are designed to compensate for solidification contraction by providing feed metal to the casting. This function is similar to that for other metals and molding methods. However, the secondary purpose of venting the mold cavity is more important in permanent molds because of the nonpermeable nature of the metal mold.

The risering system is somewhat special because of the high rate of heat extraction by the mold and the importance of the gating system in establishing favorable thermal gradients. Insulation of the risers is very important to prevent heat loss from the feeders. Heavy coats of a good insulator usually on a silicate or carbonate base must be used to be effective in providing a barrier to heat flow from risers to the metal mold. Thin films of mold coating protect the cavity sections of the mold.

The size, i.e. the cross-section of the side riser, depends entirely upon the requirement of the casting. A riser has to increase in cross-section from the bottom up for good progressive feeding properties. Much has been written and more can be written on this subject from both practical and theoretical viewpoints.

Metal flow characteristics in the riser-mold cavity system influence the solidification pattern. Molten metal in a steady, metered flow from the nozzle runs down the sprue with increasing velocity and passes through the runner into a space of considerably larger cross section than all previous passages.

According to the Equation of Continuity (1), the flow velocity decreases where the flow passage increases. Here the metal settles to a degree and gas and dross can segregate before the metal passes on through ingate to mold cavity.

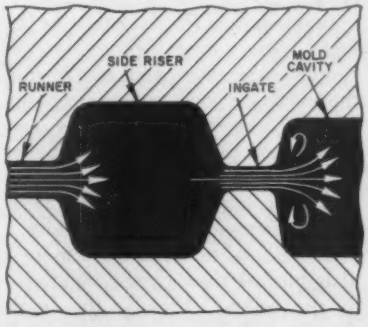


Fig. 7—Diagram shows flow pattern through the gating system. Erosion occurs where flow direction is tangential to sides

The Equation of Continuity is:

$$\rho \times A \times V = \text{constant} \quad (1)$$

where: ρ = density of the fluid
A = Cross-sectional area at any point of the flow passage
V = velocity of fluid at point of observation

The size or thickness of the ingate or riser neck, is determined by four major factors:

1. The farthest distance the metal has to flow from the ingate into the cavity.
2. The amount of metal to pass through it. That depends on the size and weight of casting.
3. The feeding requirement of the casting.
4. The finishing operations.

Ingate Size Is Important—The farther the metal has to flow from the ingate, the larger an ingate is required. The ingate is a restriction to the flow from the side riser placed between the thermally well insulated gating and risering system and the thermally poorly insulated cavity. If metal only trickles through the ingate and the metal has to flow far, it will cool too fast and freeze prematurely.

Too small an ingate also requires a high pouring temperature and increased possibility of drossing

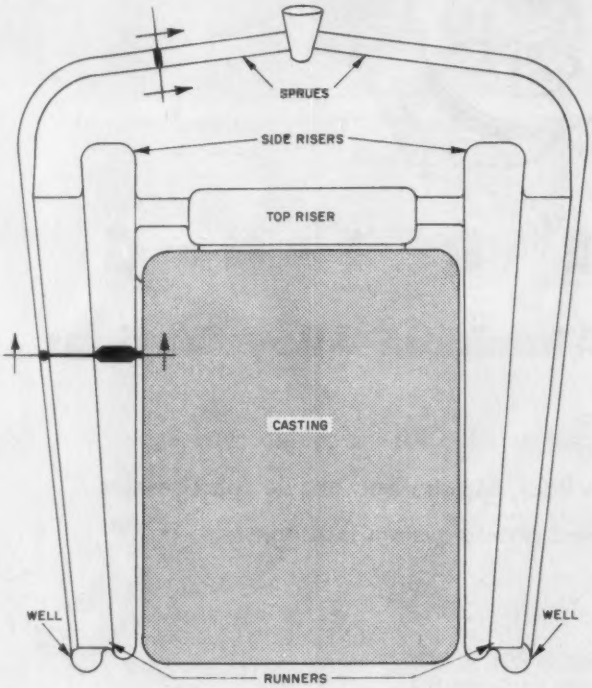


Fig. 8—Improved frame gating system includes ties between side and top risers, taller runners, inclined sprues, and improved sprue wells

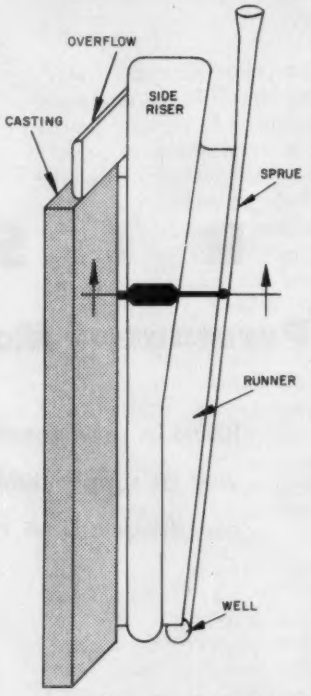


Fig. 9 — Redesigned center gating system with tapered sprue, improved sprue well, and addition of overflow

and damaged metal entering the casting. For small castings of only a few inches in size without serious feeding problems, gates of 1/16 in. may prove sufficient.

If a great quantity of metal must flow through one section of the ingate, that section should be comparatively large to prevent premature erosion of the mold cavity at that location. Erosion usually occurs within 1/16 to ¼ in. away from the edge of the ingate and is caused by unavoidable turbulence. The erosion takes place where the flow direction shown in Fig. 7 is tangential to the cavity side. The narrower the ingate, the higher the volocity of flow, and the more turbulence and erosion.

Erosion frequently is aggravated by the fact that the casting has the least amount of draft in the gating area, so that even minor erosive effects in just the mold coating cause sticking or soldering and poor release of the casting from the mold.

Determining the feeding requirements of a casting during the design stage of a mold is largely a matter of experience. Too small risers and ingates can be corrected after a trial run of a new mold. Casting economy calls for minimum gates and risers; the finishing department wants ingates as small as possible, but any casting is easier to make with oversized gates and risers than with just minimum risering. Compromise is inevitable.

Ingate-nozzle Proportions—As the metal passes from sprue through runner, side riser, and ingate into the cavity, it loses potential energy and gains kinetic energy. The metal level in the side riser is higher than it is in the mold cavity because the ingate restricts the flow. The difference of levels provides a pressure head under which the metal is pushed through the ingate into the cavity. Ideally, the levels should differ only a very small amount to prevent turbulence due to metal cascading into the cavity. In practice, a difference in levels of 1 in. rarely has a harmful influence on the flow of the molten metal.

Consequently, the cross-sectional area of each 1-in. high section of the ingate must be as large as or larger than the nozzle area. Thus, all metal issued from the nozzle can be passed through the ingate without cascading more than 1 in. Empirical determinations show that good flow patterns without objectionable cascading occur when ingate areas are adjusted so that each 1 in. of height is equal to one and one-half times the nozzle area. Reduced to a formula:

$$Wi \times 1 \text{ in.} = 1\tfrac{1}{2}\, A_n \qquad (2)$$

where: Wi = thickness of ingate
A_n = nozzle area

The formula adjusts the gate thickness to the nozzle area to insure good flow conditions. Feeding requirements may require much heavier ingates. This latter eventuality is determined by the casting-riser thickness and frequently is necessary for the heavier castings. If the gate or riser neck is too thin, shrinkage will occur in the casting opposite the ingate.

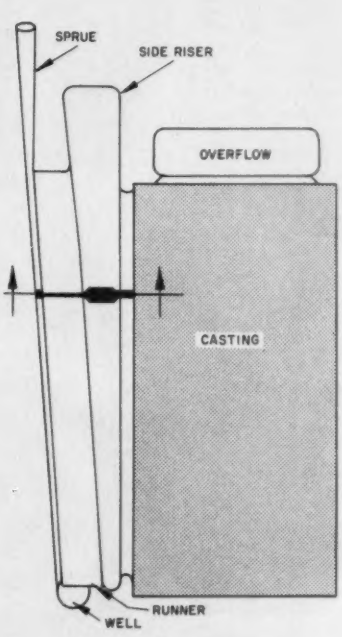


Fig. 10 — Redesigned gooseneck gating system now has a tapered sprue and runner connecting sprue and riser

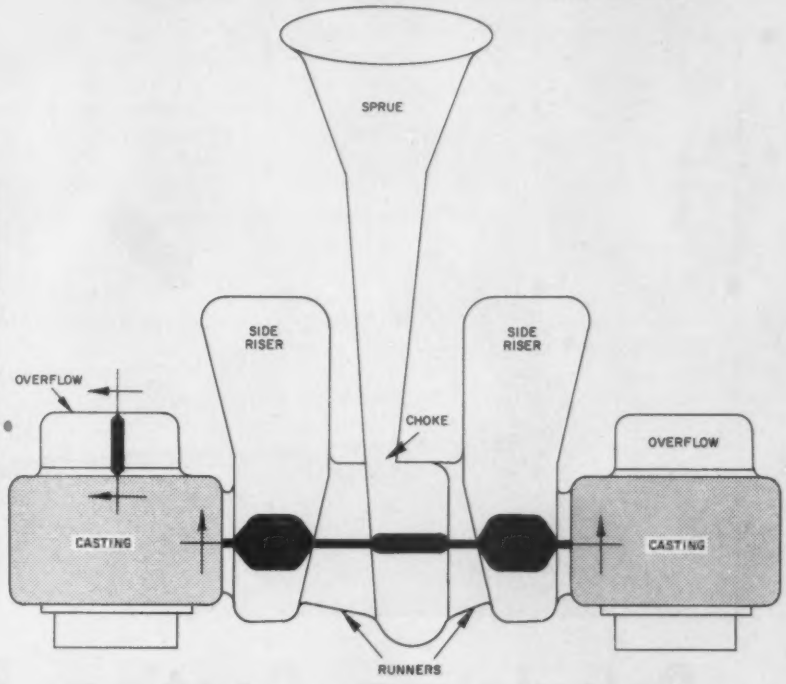


Fig. 11—Alterations to the double cavity gating system include a tapered, bottom-choked sprue, hot side risers, and top overflows

Top Risering—In many cases an overflow may be used instead of a top riser. If, however, the top center section of the casting is heavy and requires feeding, ties from the side riser to the top riser should be employed to permit hot metal to fill the riser. At the same time, the nozzle area and the runner should be raised to the height of the upper edge of the tie between side and top risers to fill the latter with hot metal by the shortest possible path.

Redesigning the System — The principles discussed in the previous paragraphs can be applied to a redesign of the commonly used gating systems sketched in Fig. 1 through 4 of last month's article on gating permanent mold aluminum alloy castings. This recommended redesign results in the systems shown in Fig. 8 through 11. The adjustments to the frame gating system in Fig. 8 include the addition of ties from the side to top riser; increased height in the runner to provide hot metal to the ties; an inclined sprue; and an improved well.

The center gating system, Fig. 9, has been redesigned with an improved, tapered sprue; better sprue well, and addition of an overflow on top of the casting. The gooseneck gating system, Fig. 10, is redesigned so it now has a conventional side riser with inclined, tapered sprue, and runner attaching the side riser to the sprue to a height over the top of the casting.

The gooseneck gate shown in Fig. 3 of last month's article has been eliminated because of the feeding and turbulence difficulties experienced with this gating design. The design of the double cavity gate has been altered, Fig. 11, by introducing a sharply tapered, bottom choked sprue, plus hot side risers and small top overflows for each casting.

In all instances, the ingates or riser necks have been designed to provide the flow patterns and feeding necessary to avoid cascading of the metal into the mold cavity and shrinkage in the casting.

Summary — Penalties rarely are escaped if one disproportions or omits one or more of the five major sections of the gating and risering system: Sprue, runner, side riser, ingate, and top riser or overflow. Many times the flow in a troublesome mold may be regulated by correcting the nozzle and the subsequent sprue portion.

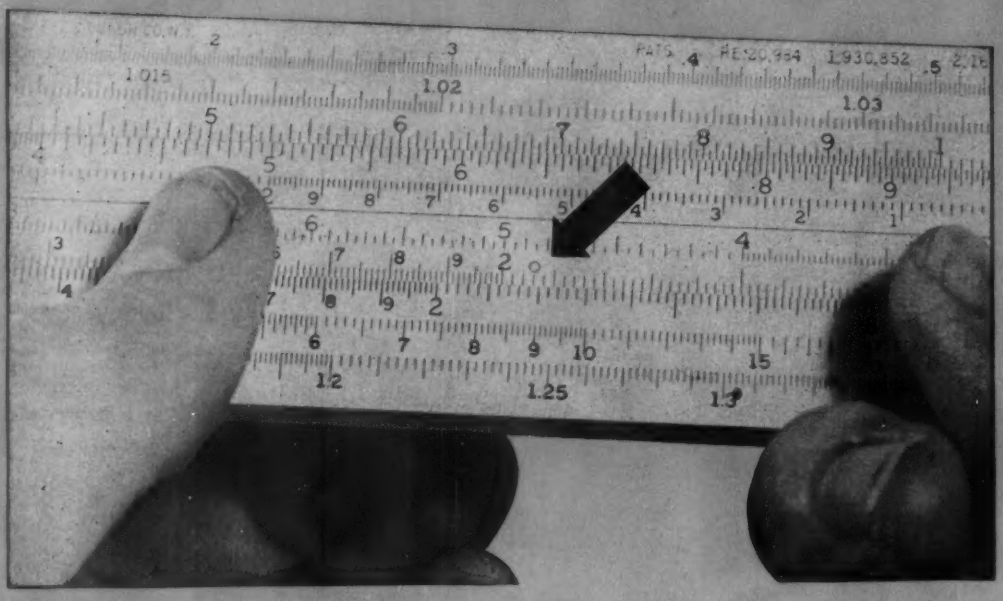
The application of rules described in this can lead to better casting quality and higher production. No longer is it necessary to arrive at a design of a gating system by compromise and past experience only. With the number of initial problems (as found in almost any new tool) reduced substantially, corrections are less extensive and costly, and production can commence soon after completion of a mold.

BIBLIOGRAPHY

1. J. F. Wallace, "Risering of Castings," FOUNDRY, November, 1959, pp. 74-81.
2. J. B. Caine, "A Theoretical Approach to the Problem of Dimensioning Risers," *Transactions*, AFS, Vol. 56 (1948), pp. 492-501.
3. W. J. Klayer, "Engineering and Design of Aluminum Permanent Molds," *Modern Metals*, August, 1947.

● For an extra copy of this article, until supply is exhausted, use card on Page 39

SOME USEFUL TECHNIQUES FOR



Calculating Casting Weights

Because the calculation of a casting's weight can mean the difference between profit and loss on an order, ACCURACY IS ESSENTIAL. Here are some pointers which may help your company do a better job on its estimating

By RUTHERFORD L. COOPER
Project Engineer
National Engineering Co.
Chicago

● MANY FOUNDRY cost systems rely to some degree on an estimated casting weight. Determining the weight of a casting, therefore, is important in establishing a sales price for that casting. Estimated weights must be accurate because inaccurate weights will result in both lost business and lost profits.

Usually the prospective customer provides a drawing of the proposed part. The more-or-less complicated shapes shown in the drawing can be broken down into groups of simple shapes, and their volumes can be computed readily. In this way, the total volume of the part is determined. Knowing the density of the metal, we need only multiply to find the correct weight.

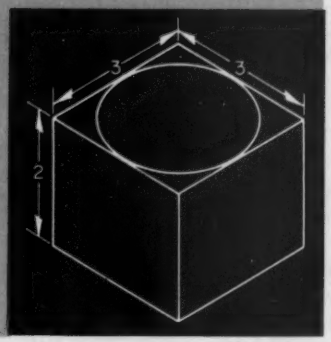
Even the most careful calculations, however, are subject to certain errors. Most foundries find that an error of plus or minus 5 per cent is tolerable, though undesirable. In certain cases, it is not possible to avoid errors of this magnitude.

Changes in molding technique alone have been known to result in a difference in casting weight of more than 5 per cent. Cost departments frequently build in hedges against such errors by using differential adjustment values or similar devices. Errors, however, are still annoying and a common source of embarrassment.

Any means which can save time or increase accuracy in weight estimating is advantageous. A few techniques which have proved valuable in certain foundries are described here. No attempt is made to cover the entire process of weight estimating, but the experienced estimator

Fig. 1—A special mark had been added to the face of this slide rule

Fig. 2—Volume of a rectangular solid multiplied by 0.785 equals the volume of the enclosed cylinder



may recognize in some of these solutions an alternative method which will be faster than his present method, or will be suitable for checking.

The Slide Rule—The favorite tool of the estimator is the slide rule. This may be a special instrument with scales made for weight estimating, or it may be an ancient Mannheim "slip-stick" worn smooth by years of use.

One special slide rule is made by Pickett & Eckel Inc., Chicago. It contains scales covering a wide variety of shapes and metals. This is an excellent all-around tool for estimating purposes. A similar special slide rule is distributed by the author's company.

Some readers may wish to add some special marking to their own favorite slide rule. An example of this is illustrated in Fig. 1, and the value of this particular mark is explained in the next section.

Weight of a Cylinder—Complex shapes cusomarily are broken down into simple shapes for calculating purposes. Probably one of the most consistently used solids is the right cylinder. It is not difficult to figure the weight of a cylinder by any of the usual methods involving the formula $V = \pi r^2 h$. When using a slide rule, however, all manipulations can be kept on the C and D scales and one operation can be omitted.

The following method offers this and certain other advantages. Assume that an unknown cylinder is enclosed in a rectangle, Fig. 2. We can find the radius and height of the cylinder and proceed in the usual manner. It would be much easier, however, if we could just calculate the weight of the rectangular solid, then multiply by a constant to get the weight of the cylinder. This can be done and, at the same time, the density portion of the calculation can be combined in such a way as to be eliminated completely.

For example, a square with sides 2 in. long has an area of 4 sq in. If we were to fit a circle inside this square it would be 2 in. in diam. The area of this circle would be πr^2, or π sq in. The ratio, therefore, between a square and a circle is $3.1416 \div 4 = 0.7854$.

The same reasoning can be applied to finding the volume of a cylinder. We simply assume the cylinder is a rectangular solid as in Fig. 2. The calculation for the volume of the cylinder then becomes a series of multiplications. For the cylinder shown in Fig. 2 the volume is $2 \times 3 \times 3 \times 0.785 = 14.14$ cu in.

If we had wanted to, we could have proceeded directly to an answer in pounds. To do that, we reason this way:

The density of a certain iron is known to be 0.262 lb per cu in. By combining this constant with the one above we can eliminate one operation. The new constant then is $0.262 \times 0.785 = 0.206$. The unit is pounds per cubic inch. The weight for the cylinder then is $2 \times 3 \times 3 \times 0.206 = 3.71$ lb.

The constant can be marked on the face of the slide rule as shown in Fig. 1 by scribing a small circle over 0.206. Thus, it is permanently available, and the mark will help eliminate errors in reading.

This method has the advantage of simplicity, being performed on the C and D scales. Interested slide rule fans may be able to devise an even simpler method suited to their own scales.

Irregular Shapes — A frequent problem is the irregular area which defies simplification into regular shapes. Even if the shape is not complicated by variations in thickness, Fig. 3, one is faced with the problem of arriving at the proper area.

A number of simple methods may be used for finding such areas, but each has certain limitations. The first three methods which follow are of limited practical value, but will be interesting to the reader. The fourth and final method is by far the best. It excels for speed, accuracy, and simplicity and has been found to be thoroughly practical.

Method 1—Find a piece of cardboard which is large enough to cover the entire shape in question. Measure the cardboard and compute its area. Next, accurately weigh it. Using carbon paper, trace the unknown area on the cardboard and cut it out. Weigh the new cardboard shape with the edge portions removed. This weight will be the key to the unknown area. To find this area, substitute in the formula: $A_1 \div A_2 = W_1 \div W_2$ or, stated another way, uncut area of cardboard $\times$ weight of cardboard cutout $\div$ weight of uncut cardboard = area.

Method 2—Locate a grid, such as a piece of translucent graph paper. Lay it over the unknown shape and count the number of squares which are contained within it.

Method 3—Rule the unknown shape off into a number of parallel strips. Measure the average length of each strip and apply the trapezoidal rule, Durand's rule, or Simp-

Fig. 3—Area of this shape can be found quickly and easily with a planimeter

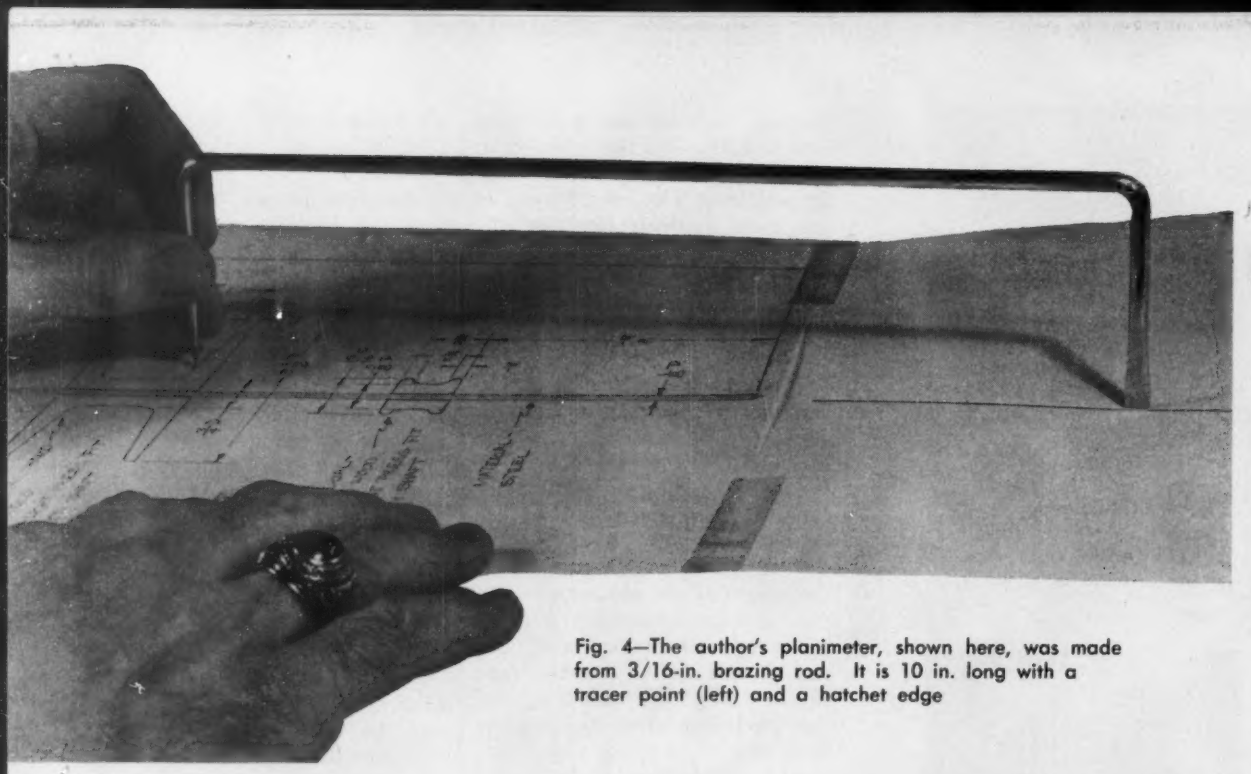


Fig. 4—The author's planimeter, shown here, was made from 3/16-in. brazing rod. It is 10 in. long with a tracer point (left) and a hatchet edge

son's rule, any of which can be found in mathematical handbooks.

Method 4—The best and most practical method of all is to use a planimeter. This is an instrument for indicating the area of a plane surface by tracing around its boundaries. The wheel type instrument is the most common, the models can be found for prices ranging from $20 to $100. For those who are interested in making their own, the hatchet planimeter is described in the next section.

In all of our discussion it is assumed that the prospective customer has provided a drawing which can be relied upon for tracing purposes. It also should be noted that draftsmen often make half-scale drawings. In this case, it will be necessary to multiply any area reading so obtained by four. The area varies as the square of any dimension.

The Hatchet Planimeter — The hatchet planimeter consists of a bar of metal some 14 in. long with 2 or so inches of each end bent down 90 degrees. One end, the tracer end, is sharpened to a dull point so that it can be maneuvered accurately around the boundaries of an area. The other end is sharpened to an edge like a hatchet, hence the name, hatchet planimeter. The sharp edge must line up with the tracing point on the opposite end, much as the blade of a hatchet lines up with its handle.

The model shown in Fig. 4 was made from a piece of 3/16-in. brazing rod. The exact length of any of the members is not critical, though this one is exactly 10 in. between the tracing point and the hatchet blade. This length, which makes a handy carrying size, has other advantages which will be apparent later.

To find the area of an unknown shape, first locate by eye the centroid, or center of gravity. A mental estimate is sufficiently close. (A more detailed explanation of centroids will be found in the next section.) Starting at the centroid, draw a straight line in any direction about 11 in. long, Fig. 5.

Place the planimeter with the tracer resting on the centroid point and the hatchet resting on the straight line. Begin tracing the figure, moving out the radial line to the boundary of the figure, then clockwise around the boundary and back to the centroid. Mark the spot where the hatchet now rests, C, by pressing it into the paper.

Leave the hatchet in its new resting place and repeat the tracing process, but this time go counterclockwise around the figure and back to the centroid. Mark its position, B, by pressing it into the paper. Do not try to steer the hatchet as it knifes across the paper; let it take its own course.

Your work should appear approximately as in Fig. 5. The short distance AC represents an inherent error which can be corrected by dividing it in two. Make a new mark, D, halfway between points A and C. Measure distance BD. This distance, multiplied by the length of the planimeter, is the area of the figure.

As noted before, the planimeter can be any length that its maker wishes, but an odd length only complicates the multiplication at the end of the problem.

The amazing thing is that this simple device works. The calculus proof of its accuracy, however, will be found to involve many pages of imposing mathematics. A workable model can be constructed from any two-bladed jack-knife. It has been suggested that a set consisting of various sizes of planimeters would prove more accurate. A hatchet attachment for a beam compass also seems feasible. Ingenious readers may be able to change the shape and construction of their planimeters to achieve additional refinements.

Solids of Revolution—A vast new field of timesavers is opened to the estimator who has provided himself with a planimeter. One of the most useful of these is a method for figuring the volume of a solid of revolution. Examples of such shapes are bells, brake drums, V-pulleys and

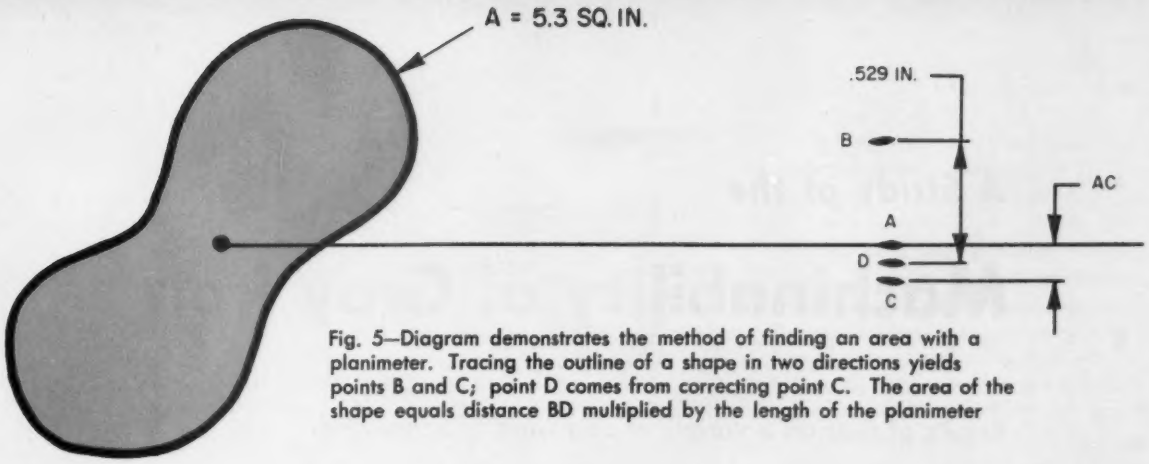


Fig. 5—Diagram demonstrates the method of finding an area with a planimeter. Tracing the outline of a shape in two directions yields points B and C; point D comes from correcting point C. The area of the shape equals distance BD multiplied by the length of the planimeter

rolls, hollow or solid.

We have chosen as an example the brake drum shown in Fig. 6. This method requires a drawing suitably accurate so that we may scale it. Most blueprints will meet this test. It need not be full scale, but remember to use the proper correction if it is not.

To find the volume (or weight) of this brake drum we easily could divide it into cylinders. A minimum of five would be required. This would give us a fairly accurate estimate of the weight with a near minimum of mathematics. It would, perhaps, be proper to solve the problem first in this manner and then check it by the solution which follows.

Step 1—Find the area of the cross section. This is done best with a planimeter, but in a pinch, the cross section grid may be substituted. In Fig. 6 we would use only half of the brake drum as shown, omitting the righthand half which is not shown. Omit any cored areas. We are interested only in the metal portions of the cross section. In this example the area is 7.3 sq in.

Step 2—Find the centroid of the cross section. This is done by placing a drafting square or ruler on edge over the drawing. Center the ruler over the area in question and pretend to place that area in perfect balance just as though the ruler were a fulcrum.

Sight carefully and when you are satisfied, draw a light line along the edge of the rule through the area. Now rotate the figure some 60 degrees and repeat the process. Draw at least six such lines. If you have done your work carefully, you will find the lines intersecting inside a small circle. Sketch this circle on your drawing, taking the center of it as the centroid.

Step 3—Measure the distance between the centroid and the centerline of the part. In Fig. 6 this is $7\frac{1}{2}$ in. We will call this distance "r" since it is the radius at which the centroid is located. Remember, in measuring on the drawing, to correct your answer if the drawing is made to any scale other than 1 = 1.

Step 4—The volume will be found by substituting in the formula $V = 2\pi rA$, where: V = volume in cubic inches, $\pi = 3.1416$, r = distance to centroid, A = area of cross section lying on one side of centerline.

For our example, the solution would look like this: $V = 2\pi rA$, or $V = 2 \times 3.1416 \times 7.5 \times 7.3$, or $V = 344$ cu in.

Students of calculus will recognize the fact that this method is based on the second theorum of Papus. The value $2\pi r$ which appears in the formula is the distance which would be swept out by the centroid if it were revolved about the centerline, or, stated another way, it is the circumference of the circle with radius "r." The algebra portion of the solution certainly is unrivaled for simplicity and the opportunities for error in the graphical portion of the solution are few.

This method recently was used to check the solution for the weight of a rather complicated shape. The original solution, which required one-half day, was checked in less than ten minutes.

● For an extra copy of this article, until supply is exhausted, use card on Page 39

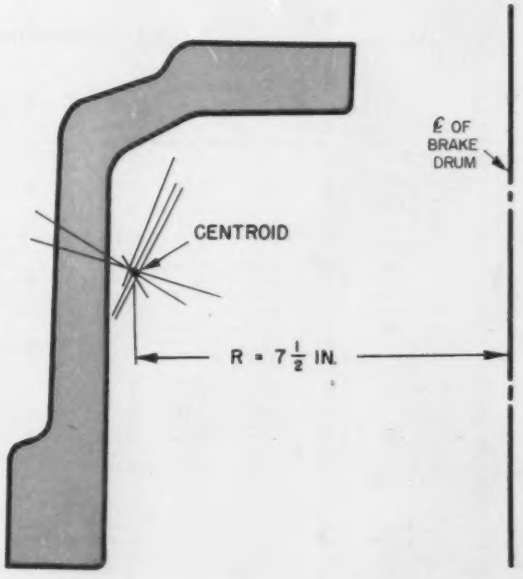


Fig. 6—Use of a planimeter simplifies finding the volume of a brake drum like the one shown here

A Study of the

Machinability of Gray Iron

Results of tests on a variety of cast irons indicate that good machinability is related to the degree of uniformity of hardness. Further, use of copper as an alloying agent produced homogeneous hardness by eliminating both hard and soft spots

By A. De SY and L. Van EEGHEM

Head
Belgian Foundry Research Center
University of Ghent

Attache
Belgian Institute for Promotion
of Research in Industry and Agriculture

● THIS ARTICLE is an abstract of the original published results of research on machinability of cast iron undertaken in collaboration between the authors (from the Belgian Foundry Research Center, University of Ghent) and Prof. E. Bodart and L. Czaplicki (from the Machinability Research Center, University of Liege).

The research was sponsored by the Study and Research Center of the Belgian Industry for Metal Processing (CRIF) and by the Institute for Promotion of Research in Industry and Agriculture (IRSIA).

The test piece used for this machinability study was a hollow cylinder with the following dimensions: Outer diameter, 8⅞ in.; inner diameter, 5¾ in.; over-all length, 17⅛ in.

The Belgian Foundry Research Center prepared 24 sleeves in unalloyed cast iron and two sleeves in alloyed cast iron (U_k and U_c, Table I). The metallurgical variables of the 24 unalloyed irons were as follows:

1. Raw materials: Swedish pig iron, irons S_1 to S_6; Belgian hematite or low-phosphorus pig iron, irons H_1 to H_6; medium-phosphorus pig iron, irons P_1 to P_6; steel scrap, graphite, and ferroalloys (synthetic irons), A_1 to A_6.

2. Three different levels of the degree of eutectic saturation, calculated according to Haneman's formula:

$$DES = \frac{\%C}{\dfrac{4.23 - 0.312\ Si - 0.274\ P}{0.80 - 0.87 - 0.95}}$$

TABLE I—Composition and Properties of Test Sleeves

Iron No.	Chemical Composition							Mechanical Properties in 1.2-in. Bar		Mechanical Properties in the Sleeves			
	C	Si	S	Mn	P	Cu	Cr	Bhn	Tensile Strength, 1000 psi	Bhn	Tensile Strength, 1000 psi	Tensile Strength, Calculated	I_r
S_1	3.68	1.42	0.009	0.64	0.066	...	...	151	25.3	108	19.0	15.3	1.24
S_2	3.27	1.33	0.007	0.67	0.064	...	...	196	42.3	160	33.1	31.2	1.06
S_3	3.04	1.35	0.008	0.69	0.058	...	...	218	52.8	193	44.5	43.7	1.02
S_4	3.44	1.95	0.010	0.61	0.058	...	...	185	37.6	137	28.2	23.8	1.18
S_5	3.16	1.77	0.009	0.58	0.061	...	...	190	41.9	136	29.0	24.6	1.18
S_6	2.95	1.77	0.008	0.69	0.056	...	...	215	53.1	188	46.2	43.0	1.07
H_1	3.60	1.26	0.015	0.54	0.078	...	...	179	34.8	153	28.5	25.8	1.10
H_2	3.31	1.31	0.013	0.53	0.068	...	...	192	37.9	167	33.9	30.5	1.11
H_3	3.04	1.35	0.017	0.58	0.074	...	...	211	41.2	188	41.3	34.1	1.21
H_4	3.45	1.80	0.015	0.56	0.072	...	...	194	37.9	152	30.0	25.7	1.17
H_5	3.16	1.80	0.015	0.63	0.076	...	...	202	40.1	171	34.1	30.9	1.10
H_6	2.92	1.79	0.023	0.54	0.063	...	...	223	46.7	192	39.9	37.2	1.07
P_1	3.46	1.29	0.054	0.61	0.50	...	...	214	40.8	195	35.1	35.2	1.00
P_2	3.18	1.51	0.056	0.62	0.50	...	...	230	45.7	203	39.9	38.3	1.02
P_3	2.92	1.42	0.060	0.60	0.52	...	...	234	49.6	217	39.8	41.8	0.95
P_4	3.32	1.91	0.049	0.61	0.50	...	...	217	38.5	191	31.8	31.9	1.00
P_5	3.03	1.88	0.049	0.64	0.51	...	...	230	46.7	211	40.5	39.5	1.02
P_6	2.80	1.89	0.049	0.60	0.50	...	...	241	50.7	224	44.7	45.5	0.98
A_1	3.60	1.27	0.029	0.71	0.069	...	...	201	37.8	176	31.4	30.7	1.02
A_2	3.30	1.25	0.029	0.69	0.068	...	...	205	42.9	186	34.5	37.3	0.92
A_3	3.04	1.24	0.029	0.68	0.062	...	...	231	53.7	102	42.6	42.9	0.99
A_4	3.46	1.58	0.030	0.56	0.059	...	...	202	39.8	183	33.9	34.1	1.00
A_5	3.17	1.91	0.031	0.68	0.057	...	...	217	51.4	199	43.6	44.7	0.98
A_6	2.91	1.79	0.027	0.60	0.059	...	...	233	53.1	205	43.2	43.5	0.99
U_k	3.43	1.01	0.030	0.53	0.067	1.93	...	214	41.6	188	34.8	33.9	1.02
U_c	3.43	1.00	0.030	0.61	0.062	2.00	0.23	224	48.0	200	40.3	39.8	1.01
C_{ST}	3.09	1.61	0.061	0.70	0.090	1.60	0.05	269	54.0	229	35.9	42.0	0.85
D_{ST}	3.18	1.85	0.064	0.73	0.100	...	0.05	217	41.3	187	26.7	32.8	0.81
FD_{ST}	3.20	2.50	0.048	0.55	0.68	...	0.05	235	38.3	188	27.4	27.0	1.02
FS_{ST}	3.26	1.63	0.072	0.74	0.09	1.80	0.30	277	48.2	227	36.1	35.5	1.02
GB_{ST}	3.07	1.30	0.075	0.76	0.06	1.64	0.30	277	64.4	236	42.6	49.7	0.86

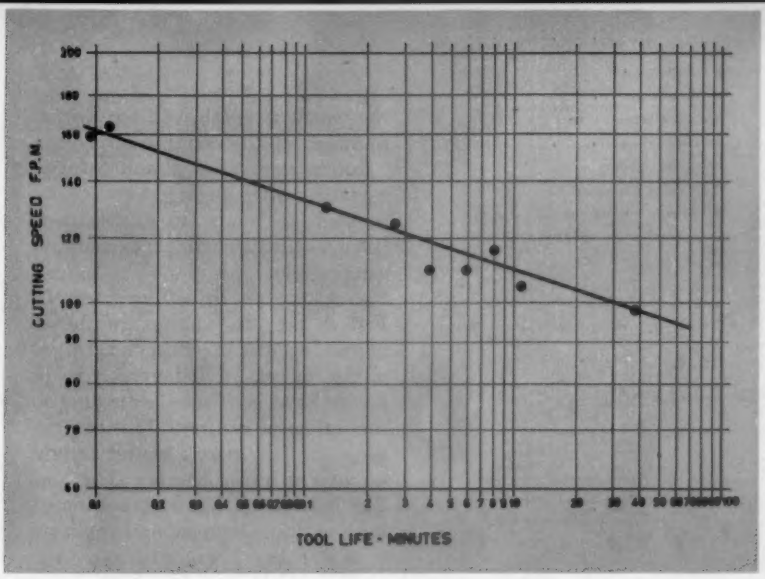


Fig. 1—Plot is used to find cutting speed for 60-min tool life

3. Silicon content: 1.24 and 1.9 per cent Si.

Laboratory melting was done in a 250-lb acid-lined M.F. induction furnace.

The foundries of the Societe d'Electricite et de Mecanique, Ghent, poured five sleeves in industrial cupola iron (C_{27}, D_{28}, FD_{29}, FS_{30}, and GB_{31}, Table I).

All of the sleeves were bottom-poured in silicate-bonded sand molds prepared in industrial conditions by the SEM foundries. With each sleeve, three bars 1 3/16 in. in diam were cast, out of which five Type A tensile test pieces were machined. Type A test pieces also were cut from the risers.

In an analysis of the correlation between the wall thickness and the mechanical properties of a casting, De Sy and Van Eeghem found[1] only a small difference between the properties of an iron cast in a bar 2⅛ in. in diam and in a bar 3-9/16 in. in diam. One therefore may conclude that there will be an even smaller difference between a bar 3 9/16 in. in diam and one with a larger diameter. Since the wall thickness of the sleeves corresponds practically to the bar 3 9/16 in. in diam, the mechanical properties determined in the risers also will be representative of the sleeve itself.

Chemical compositions and mechanical properties of the irons are shown in Table I. The mechanical properties of the bar 3 9/16 in. in diam and of the sleeve made it possible to calculate a strength index for the irons (last column, Table I).

The strength index, I_r, is the ratio of the tensile strengths, as follows:

$$\frac{\sigma_t \text{ calculated}}{\sigma_t \text{ measured}}$$

where $_t$ calculated is given by Collaud's equation

$$\log \sigma_t = \log \sigma_t 30 + 1.57 (\log \Delta_x - \log \Delta_{30}),$$

which De Sy and Van Eeghem proved to be valid except where the graphite is undercooled (Types D and/or E).

The strength index shows that the Brinell hardness is lower, equal to, or higher than normally can be expected for a particular tensile strength.

If $I_r > 1$, the iron is relatively soft, but has a high strength. If $I_r < 1$, the iron is relatively hard, but has a low strength.

The irons prepared with Swedish pig iron (S_1 to S_6) or with Belgian hematite (H_1 to H_6) were inoculated with silico-manganese-zirconium and with ferrosilicon. The strength indexes of these irons are greater than 1 (up to 1.24). They are soft irons.

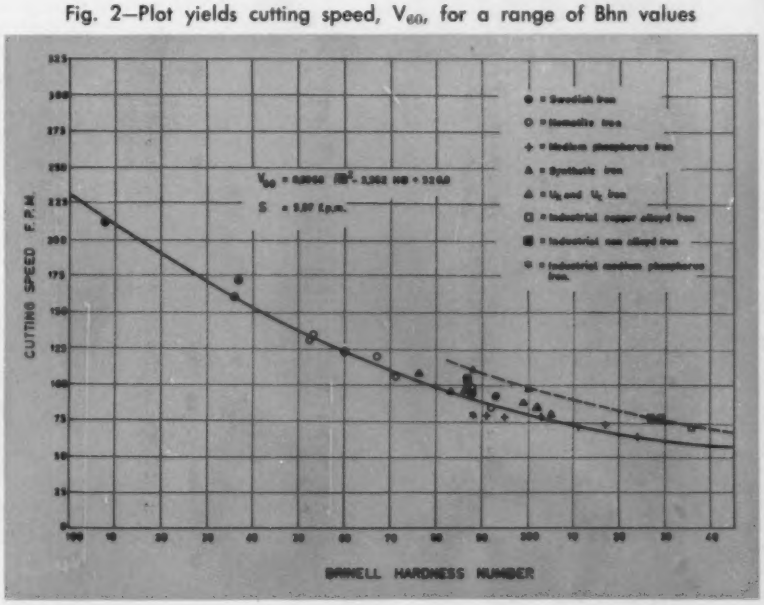
The synthetic (A_1 to A_6), medium phosphorus (P_1 to P_6) and alloyed irons (U_k and U_c) and also two industrial irons (FD_{29} and FS_{30}) are gray irons of normal hardness—that is, I_r equals about 1. Three industrial irons are hard irons (C_{27}, D_{28}, and GB_{31}). In them, I_r equals 0.85, 0.81, and 0.86.

Determination of Machining Properties — Machinability of the irons was determined by turning tests on a lathe with electronic controls which permitted stepless variation of the cutting speed.

The tools were of 18-4-1 high-speed steel. Their characteristics are as follows:

Composition	18-4-1
Manufacture	Boehler Super Extra Rapid
Angles	⅝ x 15/16 in.
Back rake	14.2 deg
Side rake	23.8 deg
End relief	8 deg
Side relief	8 deg
End cutting edge angle	30 deg
Side cutting edge angle	30 deg
Nose radius	0.020 in.

Fig. 2—Plot yields cutting speed, V_{60}, for a range of Bhn values



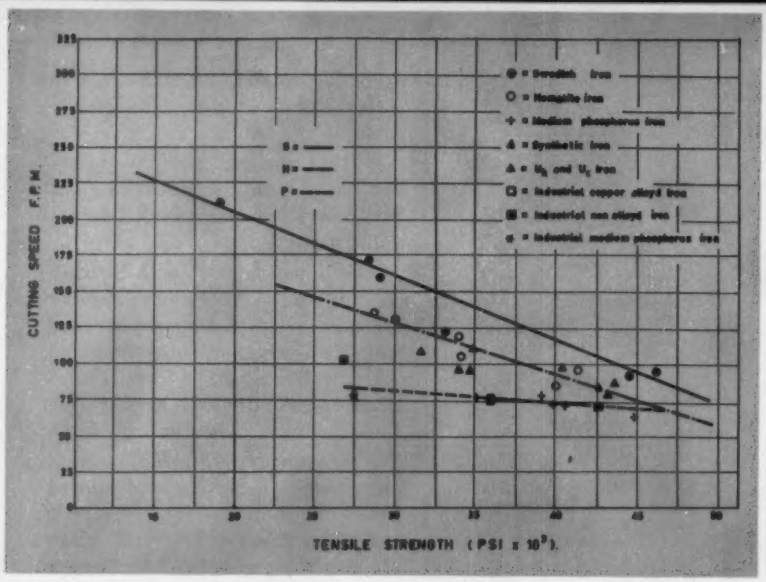


Fig. 3—V_{60} is plotted here as a function of tensile strength

All cuts were made dry at a depth of cut of 5/32 in. and at a feed rate of 1/64 ipr. The machinability has been based on tool life. By this method, a tool is run at a certain cutting speed until final breakdown failure occurs.

When the tool life T is determined for different cutting speeds V, and the results are plotted in a double-logarithmic diagram, the points scatter around a straight line (Fig. 1). That means the cutting speed-tool life relationship can be given by the equation $VT^n = C$, in which n is an experimental constant value equal to 0.08 for all the cast irons tested. The cutting speed for a 60-min tool life (V_{60}) was selected as a criterion for the machinability. The V_{60} value is obtained by extrapolation up to T = 60 min (see Fig. 1).

Results of Machining Tests—Results of the machining tests have been plotted in 30 double-logarithmic diagrams, of which only one, Fig. 1 (iron S_6), is shown as an example.

The V_{60} values determined by extrapolation in these diagrams are shown in Table II, together with the degree of eutectic saturation, the tensile strength, and the Brinell hardness of the test pieces.

TABLE II—Results of Machinery Tests

Iron No.	D E S	Ten Str, Sleeve, 1000 psi	Bhn Sleeve	V_{60} fpm
S_1	0.97	19.0	108	210.6
S_2	0.86	33.1	160	121.4
S_3	0.80	44.5	193	91.9
S_4	0.95	28.2	137	170.6
S_5	0.86	29.0	136	160.1
S_6	0.81	46.2	188	94.9
H_1	0.94	28.5	153	133.5
H_2	0.87	33.9	167	118.8
H_3	0.80	41.3	188	95.8
H_4	0.94	30.0	152	129.2
H_5	0.87	34.1	171	105.3
H_6	0.80	39.9	192	84.6
P_1	0.96	35.1	195	76.7
P_2	0.88	39.1	203	77.4
P_3	0.80	39.8	217	71.5
P_4	0.95	31.8	191	77.4
P_5	0.86	40.5	211	70.5
P_6	0.80	44.7	224	62.9
A_1	0.84	31.4	176	108.9
A_2	0.86	34.5	186	95.8
A_3	0.80	42.6	202	84.9
A_4	0.93	33.9	183	95.4
A_5	0.87	43.6	199	88.2
A_6	0.80	43.2	205	79.4
U_1	0.88	34.8	188	110.5
U_2	0.88	40.3	200	97.1
C_{27}	0.84	35.9	229	76.4
D_{28}	0.87	26.7	187	102.0
FD_{29}	1.01	27.4	188	78.4
FS_{30}	0.88	36.1	227	75.7
GB_{31}	0.80	42.6	236	69.8

Interpretation of Results—Interpretations were made in terms of the selected tool life versus Brinell hardness, tensile strength, and chemical composition.

1. *V_{60} versus Brinell hardness*: In Fig. 2, the V_{60} values are shown plotted against the Brinell hardness of the test pieces. Different types of points have been used, according to the nature of the irons. One can observe that the points scatter around a curve of higher degree. The V_{60}-Bhn correlation has been calculated by a multiple regression of the form $y = a + bx_1 + cx_2$, with $x_2 = x^2_1$. This calculation has been based on the data obtained on irons S, H, and P, which were considered reference irons.

The equation of the curve is given by the following:

$$V_{60} = 0.0068\ \text{Bhn}^2 - 3.582\ \text{Bhn} + 520.0$$

The standard deviation of the population (irons S, H, and P) of the curve is 5.87 fpm.

The position of the different types of points along the curve shows that from the three reference irons, those prepared with Swedish pig iron are the most machinable and that the medium-phosphorus irons are the least machinable.

The synthetic irons seem to have the same machinability as the reference irons. Indeed, the maximum deviation of the V_{60} values of the curve is about equal to S.

On the other hand, the experimental points corresponding to the copper-alloyed irons lie on another curve (dashed line), showing better machinability for these irons as compared with the unalloyed irons. A copper-alloyed iron of 200 Bhn has the same machinability as an unalloyed iron of 181 Bhn, and a copper iron of 227 Bhn has the same machinability as a medium-phosphorus iron of 205 Bhn.

The curve of Fig. 2 is very important since it provides the determination of V_{60} as a function of Brinell hardness, whatever the nature of the raw materials and independent of the inoculation treatment.

For the copper-alloyed irons, one should consider the dashed line.

The variation of machinability with hardness is very important for

low hardness; it decreases with increasing hardness. The variation of machinability with hardness is not, however, very well shown by comparison of the V_{60} values. The following mathematical derivation gives a better idea of this variation:

Suppose that a first iron with a V_{60} equal to V_{1-60} is machined at a cutting speed V_1.

The tool life T_1 will be given by the equation

$$V_{1-60} \times 60^{0.08} = V_1 T_1^{0.08} \qquad (1)$$

Let us now suppose that a second iron is machined at the same cutting speed V_1, but that the V_{60} of this iron is superior to that of the first iron. For instance,

$$k \times V_{1-60}$$

In this instance, tool failure will occur after a time T_2 given by

$$k \times V_{1-60} \times 60^{0.08} = V_1 T_2^{0.08} \qquad (2)$$

Dividing equations (1) and (2) member by member, we obtain

$$k = \frac{T_2^{0.08}}{T_1^{0.08}} \text{ or}$$

$$k = \left(\frac{T_2}{T_1} \right)^{0.08} \text{ or } (3)$$

$$T_2 = T_1 \times \sqrt[0.08]{k} \text{ and finally}$$

$$T_2 = k^{12.5} T_1 \qquad (4)$$

Equation (4) shows that for any given cutting speed, the tool life will be increased by a factor $k^{12.5}$ when the V_{60} value itself is multiplied by k.

Equation (4) leads to the following, Table III:

Table III

Variation of V_{60}, %	k	$k^{12.5}$
10	1.1	3.3
20	1.2	9.6
30	1.3	26.9

The V_{60} of an unalloyed iron of 200 Bhn is equal to 79.07 fpm. For a copper-alloyed iron of the same hardness, the V_{60} is equal to 97.11 fpm.

The factor $k = 97.11 \div 79.07 = 1.23$, and $k^{12.5} = 13.3$. Thus the machinability of the copper-alloyed iron of 200 Bhn, in terms of tool life, will be 13.3 times better than for an unalloyed iron of the same hardness.

It is known that the hardness of cast iron increases with the addition of copper. The increase in hardness by copper addition of 1.6 to 2 per cent corresponds extremely well with the horizontal distance between the curve in the full line and the curve in the dashed line, Fig. 2. Thus one also may say that copper increases the hardness of cast iron without decreasing the machinability.

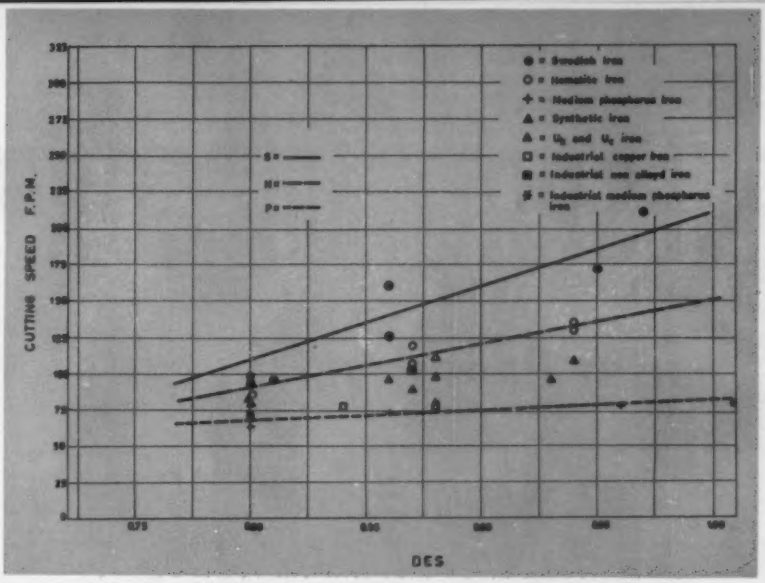


Fig. 4—This plot shows correlation between V_{60} and composition

2. *V_{60} versus tensile strength (σ_t)*: In Fig. 3, the V_{60} values have been plotted against the tensile strength measured in the cast iron sleeves. This diagram shows that there is no simple correlation between V_{60} and tensile strength σ_t.

For each value of σ_t, there are several values of V_{60}, depending on the nature of the raw materials.

The points for the reference cast irons (S, H, and P) fall in three different zones in which regression lines have been drawn.

3. *V_{60} versus chemical composition*: Fig. 4 shows the correlation between the V_{60} values and the chemical compositions of the irons, represented by the degree of eutectic saturation according to Haneman. Except for the slope of the lines, Fig. 4 shows the same characteristics as Fig. 3.

One also may conclude that there is no simple correlation between the V_{60} and the chemical composition and that for the same degree of eutectic saturation, the irons made with the Swedish pig iron are the most machinable and the medium-phosphorus irons the least machinable.

Summary—The main conclusion derived from the study unquestionably concerns the definite correlation between machinability and Brinell hardness. But hardness itself is an important property with regard to wear resistance.

One therefore should not consider trying to improve machinability at the expense of quality by producing eutectic or even hypereutectic and consequently very soft irons.

How, then, can machinability be improved?

The tests on copper-alloyed irons seem to show the way. It has been demonstrated[2] that copper is a graphitizing element during solidification and an antiferritizer during transformations in the solid state. Thus the effect of copper is the production of homogeneous hardness by elimination of hard spots (free carbides) and soft spots (free ferrite). The result is a considerable improvement of machinability for a given hardness level.

To a lesser degree, nickel may produce the same effect. The lower machinability of the medium-phosphorus irons probably is due to the presence of hard spots of steadite.

As a final conclusion, it can be said that to obtain good machinability, one must develop the most nearly uniform hardness distribution possible.

REFERENCES

1. A. De Sy and J. Van Eeghem, "Research on Lamellar Graphite Gray Iron—Study of the Correlation: Properties, Massivity."

2. A. De Sy and J. Van Eeghem, "The Mechanism of Ferritization of Gray Iron and the Study of Its Relationship to the Elements Sn and Cu," *La Fonderie Belge*, December, 1954.

3. A. De Sy, "Copper in Cast Iron—Principal Considerations," *Modern Castings*, June, 1959.

4. A. De Sy, W. Simoens, and J. Vidts, "Synthesis of the Effects of Copper in the Gray Irons," *La Fonderie Belge*, April, 1954.

● For an extra copy of this article, until supply is exhausted, use card on Page 39

ESPRIT de CORPS

in a Foundry

What makes a worker do his best—

pay rates, fringe benefits, easy working conditions?

Maybe it's a co-operative management attitude

toward the worker and his problems

By ROBERT H. HERRMANN
Associate Editor

● ESPRIT de CORPS is an outstanding characteristic of the workers at Draper Corp.'s gray iron foundry, Hopedale, Mass. This is a happy place in which to work. That fact shows in the faces of the men; it can be heard in snatches of song hummed or whistled; it is a feeling in the air.

It shows up quite practically in a long history of congenial labor relations. The foundry has had only one written grievance in 9 years.

This is a busy place, too. The pace is fast. Molding rates, for instance on the two 18-station squeezer machine loops range as high as 65 to 70 molds per molder per hour. Total output per loop during a 7-hr day is about 5000 molds. That averages to about 40 molds per molder per hour. The most commonly used flasks measure 12 x 15 and 12 x 18, but flasks range from 10 x 15 to 12 x 22 in.

These are not new molding loops, but they, too, have a high production record, having operated at over 97 per cent efficiency since installation. That is less than 3 per cent downtime.

The intangible factor that inspires workers to greater-than-average effort is difficult to segregate and describe. It can result from one or a number of elements. The fact that workers at the Draper foundry have been inspired is evident.

The inspiration stems in part from the incentive system under which all molders and coremakers and some other employees work. Once incentive rates are set on a particular job they are not lowered if a man increases his production rate unless the method is changed.

It stems in part from the fact that the company provides a retirement plan, minimum cost insurance, sick benefits, and hospital cost assistance.

Basically it stems from a management attitude that makes employees feel that they are working with the management group, not for it.

Make Textile Machinery—Most castings produced at the Draper foundry are used in company-made textile machinery. Castings range in weight from ounces to 200 lb. The daily melt runs between 150 and 300 tons, depending on the state of business. The variety of castings produced is indicated by the fact that 300 to 400 different patterns are used each day.

Casting surface finish is critical for textile machinery castings. A high degree of smoothness is desirable to reduce as much as possible the accumulation of lint which gathers on rough surfaces.

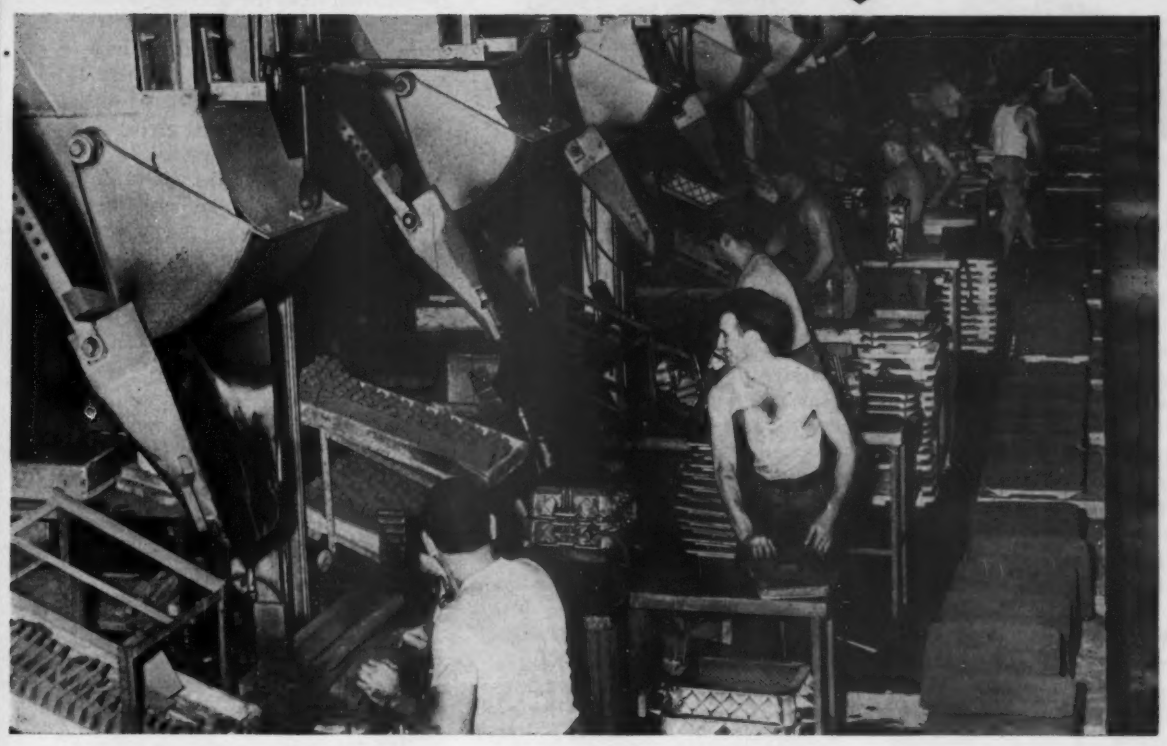
For many years, certain parts have been cast with finish and dimensional tolerances such that little, if any, machining is required. Tolerances of 0.012 to 0.015 in. are common on some high production castings. Certain other castings are produced to closer tolerances. A shuttle eye, which is about the size of a 1-in. cube, for instance, has a tolerance of plus 0.005, minus 0.010 in.

Sand Is Important—The close tolerance ranges and smooth surface requirements of castings are obtainable only with close attention to the proper preparation of sand mixes.

Samples of sand from all incoming cars are checked before the cars are unloaded, and periodic checks are made on samples of sand from

Molds are produced at the rate of one every two minutes on this recently installed slinger molding line

Busy, and apparently happy, molders on this 18-station squeezer line produce about 5000 molds during a 7 hr day



the various storage bins. The different sand mixes are tested at regular intervals. Test results are sent to the foundry superintendent, the main plant laboratory, and to the two men assigned to sand control supervision. Grain fineness and combustible content are watched carefully.

This is part of an over-all program of process control started recently at the Draper foundry. The program involves recording on a card all process detail concerning each job. Thus, all information is available when a job is reordered. Considerable improvement in casting quality and production rate has been achieved since inception of the process control program.

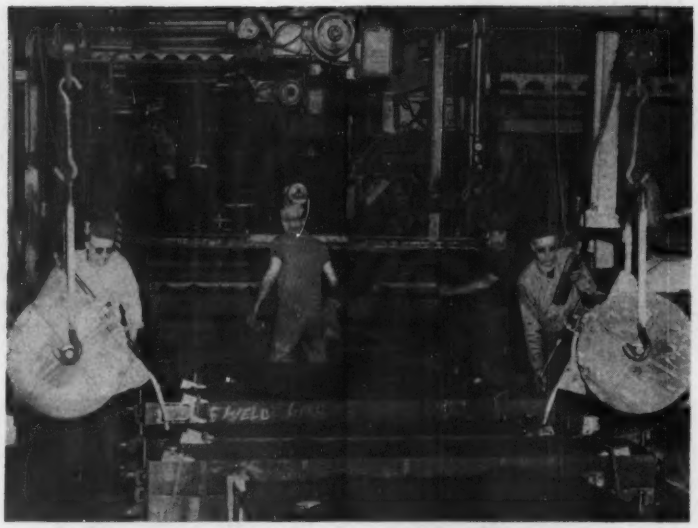
Several molding sand mixes are used. They differ mainly according to the type of casting being made and the molding method employed. For instance, molding sand used on the two squeezer machine loops and on the tight flask line has an average grain fineness of AFS 95-110; permeability, 45-55; green strength, 11-13 psi; dry strength, 65 average; moisture, 2.6-3.2 per cent, and volatile combustible material, 1.5-2.0 per cent.

The tight flask line has 28 stations, including cope and drag machines, some squeezers, and hand molding with air rammers. Molds are set off on gravity roller conveyors where they are poured.

Large molds and short run work are handled in two floor molding bays. Some of this type of work also is done along a line traversed by a mobile sand slinger on rails.

Two basic natural sands are used for floor molding. One has a fineness of AFS 60-70, 15-18 per cent clay, and 6.0-6.6 per cent moisture. The other has AFS 125-140 fineness, 6.12 per cent clay, and 5.8-6.2 moisture.

Have Specialty Section—Special castings, usually small and requiring exceptionally close tolerances, are produced in a bay which once housed a brass and bronze foundry. Iron for these parts is duplexed in



Molds produced on the squeezer line are closed and poured on gravity roller conveyors

a small rocking electric furnace. Four squeezer machines form the molds. Typical of the castings produced in this department are the 4-oz shuttle eyes for looms discussed previously.

Facing sand for molds for that type of casting has an average grain fineness of AFS 195. Permeability is 8-12; green strength, 10.0-12.5 psi; dry strength, 20 psi min; moisture, 5.2-5.8 per cent, and volatile combustible material, 1.5-2.0 per cent.

Facing sand used in the sand slinger has an average grain fineness of AFS 70-80; permeability, 100-130; green strength, 10-12 psi; dry strength, 60 psi min; moisture, 4.0-4.6 per cent, and volatile combustible material, 3.5-4.0 per cent.

Backing sand used in slinger molding has an average grain fineness of AFS 70-80; permeability, 65-75; green strength, 11-13 psi; dry strength, 60 psi min; moisture, 4.0-4.4; clay 8.5-9.5, and volatile combustible material, 3.00-3.25.

Mechanized Slinger Line — The recently installed slinger molding line is a highly mechanized system for producing large molds at a production rate of half a mold a minute. In a 7½-hr day it turns out 180 to 210 complete molds. Flasks measure 14 x 78 in., 16 x 95 in., 30 x 96, and 48 x 65 in. Eighteen men work the line.

Patterns are bolted on carriers called sleds. Runners on the bottoms of the carriers ride on powered rollers comprising part of the line. A worker, using a hoist on a bridge crane, sets flasks on patterns. Flasks are prefilled with facing sand from overhead hoppers. They are rammed at the next station by a man riding a sand slinger. Two men at the next station strike off the half mold and set the bottom board in place.

Powered rollers carry the assembly around to a rollover draw machine. Mold halves are pulled out of the rollover machine to gravity roller conveyors where cores are set and the mold is closed by crane. Pouring is done with ladles suspended from a bridge crane.

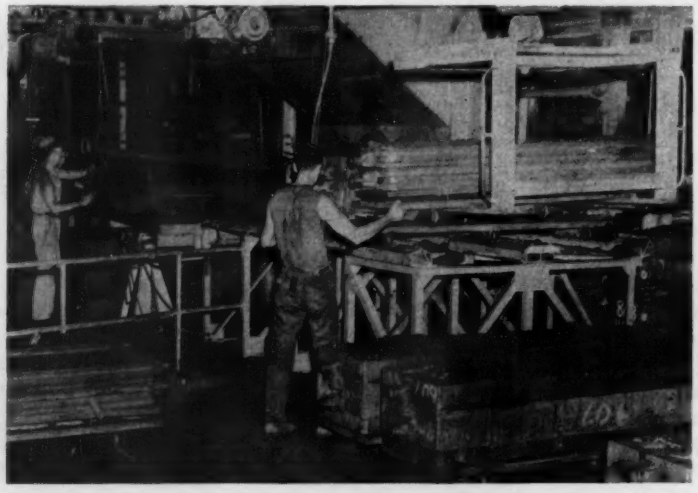
A worker transfers poured molds with a bail and powered monorail carrier to any of four cooling lines. The molds rest on wheeled pallets which ride on rails mounted about a foot above the floor. At the other ends of the rails a man with similar bail and hoist equipment lifts molds and pallets to waist-high rails along which the pallets roll by gravity to a vibrating, hooded shakeout. Flasks are removed from the shakeout with a bridge crane and set on a gravity roller conveyor from which they are selected and moved by another bridge crane to proper patterns on skids.

Wheeled pallets are pulled to a swinging section of roller conveyor which is swung to align with the roller conveyor carrying the pallets to the setting area. Castings removed by crane from the shakeout are put in skid boxes for movement to the cleaning room.

An interlocking switch system for controlling movement of molds in production is an interesting feature of the system. Four interdependent work stations are involved: Flask placement, flask prefill, strike-off and pallet placement, and rollover.

A man at each work station presses a button when work at that station has been completed. But the powered rollers to move the sleds to the next work station are not energized until the fourth button is pressed to close the electrical circuit.

● For an extra copy of this article, until supply is exhausted, use card on Page 39



Wheeled pallets containing the poured molds are lifted by bail and hoist to waist-high rails leading to vibrating shakeout

QUESTIONS and ANSWERS

- **Pasting sectional CO_2 cores together can be eliminated by assembling components before they are gassed**
- **Several different materials can be used for repairing or renewing foundry gangway floors**
- **Three different methods are suggested for mounting bronze seats in iron-body gate valves**
- **Core penetration by iron may be due to underbaking, too coarse sand, or cracked core coating**

Has Difficulties with Cores

We have been trying the CO_2 process for making cores with good results except with some older core-boxes for producing half cores which are pasted together. Pastes which require water do not work, and we wonder if there is some other type which will overcome the trouble. Also can you suggest a type of blackening for use on such cores for bronze and aluminum castings?

For pasting sectional CO_2 cores together, you should use a paste which employs a volatile carrier or vehicle such as isopropyl alcohol. Those are available on the market and will serve satisfactorily when the manufacturers' directions are followed. It appears to us that it should be possible to eliminate the need for pasting by "booking" the two half boxes together, then gassing.

Several possibilities for gassing appear feasible. One method would be to remove the upper half-box and gas in a chamber or hood placed over the core and box; care would have to be taken, however, in removing the top box to prevent distortion or damage to the exposed part of the core. Another method would be to inject the gas through the core prints, and a third procedure would be to drill a number of holes of sufficient size to accommodate the injection needle at various points in the upper half-box. It also might be advisable to place some holes in the bottom half to insure gas penetration through the core.

Generally, blackenings or coatings are not needed with bronze and aluminum castings. Possibly the sand you are using is too coarse to obtain the desired surface finish, and it would be worthwhile to try finer sand.

Material for Gangway Floor

Our foundry gangways need renewal in some areas and repair in others, and we would like to know a suitable material which will stand hard wear as well as resist spillage of molten iron.

So far as we know there is no standard for foundry floor construction, and various materials are used. One suggestion is a concrete base with a top finish about ¾ to 1 in. thick composed of 1 part neat cement and 2 parts 40 to 60 mesh silica sand.

One proprietary material for surfaces employs a metallic aggregate and another uses an abrasive aggregate. Another procedure is use of hard-burned brick such as used for paving which is laid on a concrete sub-base. The latter is covered with a 1-in. layer of sand and the brick placed closely in position. A thin cement grout is brushed carefully over the brick surface to fill the joints and cement them together.

Mounting Seat in Valve Body

Can you supply us information on the acceptable procedure for mounting bronze seats in iron-body gate valves?

Various methods are used for mounting bronze seats in iron-body gate valves. One is to use a machined bronze seat which is screwed into the iron body, or pressed on with tongue and groove. Another is to place the bronze ring on the core, and cast the iron body around it. After partly machining, the bronze is pressed or rolled to insure a tight joint. Still another method is to machine the tubular ring or seat, and then roll it into place.

Cores Are Penetrated by Iron

We are having considerable trouble with iron penetrating into center cores in chilled iron castings made with a tellurium addition to the iron. Cores are made with a heavy oil-sand mixture and are coated with a good steel core wash.

It is difficult to supply a definite reason why penetration occurs in the cores, and we can suggest only some possible causes. Since you state that you are using a heavy oil mix, there is a possibility that the cores are underbaked. Underbaked cores contain an excess of combustible material. When ignited, that material may create hot spots which disintegrate the core, cause cracking, or disrupt the coating. We suggest reducing the amount of oil, if only for the sake of economy.

Another possibility is that under the particular conditions of temperature and ferrostatic pressure involved, the sand is too coarse and

permits penetration, even though a coating is used. Last but not least, the corewash may crack or spall off because of differences between expansion of the wash and of the underlying sand when in contact with the molten metal. Often heavy coatings crack or spall when thinner ones do not.

Lining Materials for Cupola

Reading the literature about the cupola we have run across references to acid and basic linings and have examined several sources to find the difference between the two without much satisfaction. Can you tell us what materials form acid and basic linings?

Although there are many definitions of acids and bases, we believe that in brief the distinction between acid and basic linings, refractories, and slags in metallurgical applications is the amount of free silica available for combination with the basic oxides, such as lime and magnesia.

Silica brick or sand which are practically all free silica are highly acid, whereas firebrick containing relatively small quantities of free silica is less strongly acid. Basic refractories include magnesite bricks, crushed and burned magnesite, and dolomite. Dolomite is a natural mineral composed of calcium and magnesium carbonates.

Silica bricks are not used to any great extent in cupola linings since they tend to spall and disintegrate with repeated heating and cooling under the usual conditions of operation. Basic linings permit use of slags high in lime, and are used to a considerable extent where low-sulfur iron is desirable such as in making ductile iron. Carbon linings, which are neutral, also are used for the same purpose.

Iron Plate Castings Have Open Grain

We make surface plates weighing from 500 to 6000 lb and from time to time run into an open grain or soft iron condition. The plates are 36 to 40 in. wide, 40 to 144 in. long, and 4 to 6 in. high with a metal thickness from 1¼ to 1½ in. They are produced in dry sand core molds from a mixture of 50 per cent steel scrap, 30 per cent pig containing 3.8 per cent silicon and 0.65 per cent manganese, and 20 per cent machinery scrap with 2½ lb silvery piglets to the 1000-lb charge.

Sufficient of these charges are placed in the cupola first, followed by softer or higher silicon charges for other castings. Molds containing the surface plates are shaken out while still red hot. Do you think the fast cooling causes the open grain structure in the plates?

Although the surface plate castings are shaken out while red hot, that procedure should have little effect on the microstructure. To obtain any change in microstructure, the temperature must be at or above the critical or transformation temperature of the cast iron, which varies somewhat according to the silicon and manganese contents. In your case the metal charge shows about 1.54 per cent Si and 0.45 per cent Mn, placing the critical temperature slightly over 1400° F.

Temperature judgment by color is not very accurate since surrounding brightness conditions play an important part, but generally the temperature at red heat is given as 1000° F. Even if that is 100 or 200 degrees low, the temperature still would be well below the critical, where transformations in structure occur. It might be pointed out that if shaking out at red heat had any effect, it would be to decrease graphitization and the occurrence of "open grain" structure.

Our opinion is that the structure you mention results from some change in composition, and that view seems to be borne out by your comment on spasmodic appearance. It may be that the trouble is due to pouring some of the plates too close to the end of the melting cycle for the high steel scrap charges, although there may be errors in charge makeup.

The latter cause of course, requires closer supervision, but the former calls for a definite means of identifying when the change in mixtures occurs. That can be accomplished by placing a double split of coke on the last steel scrap charge before putting in the higher silicon charge. When all the steel scrap charges are melted, there will be a decrease in melting rate.

Coating for Permanent Molds

Some time ago we saw a formulation for a mold coating for permanent molds which contained zircon flour, talc, sodium silicate, etc., and required boiling in its preparation. Our present material has a tendency to chip or flake off when a heavy coating is applied.

Although we do not recall the formulation you mention, one reported to give satisfactory results is prepared by heating to boiling 1 gallon of water. While held at the boiling point 12 oz of 40 per cent sodium silicate (water glass), 10 oz of whiting and 1 oz of graphite or rouge are added and stirred in. The solution is allowed to cool before use, and always stirred well to insure that the solids are in suspension. We believe, however, that you will be much better off by purchasing one of the many proprietary mold coatings which are on the market, and following the manufacturer's directions for application.

We suspect your trouble with your present mold coating chipping or flaking is due to the method of application. First, all the old coating should be removed by wire brushing or light abrasive blasting. Then the mold should be heated to around the operating temperature, and a light coating sprayed on. That is rubbed down with steel wool; a second coat is applied and rubbed down, and the final coat is sprayed on, but this one is not rubbed down as were the others.

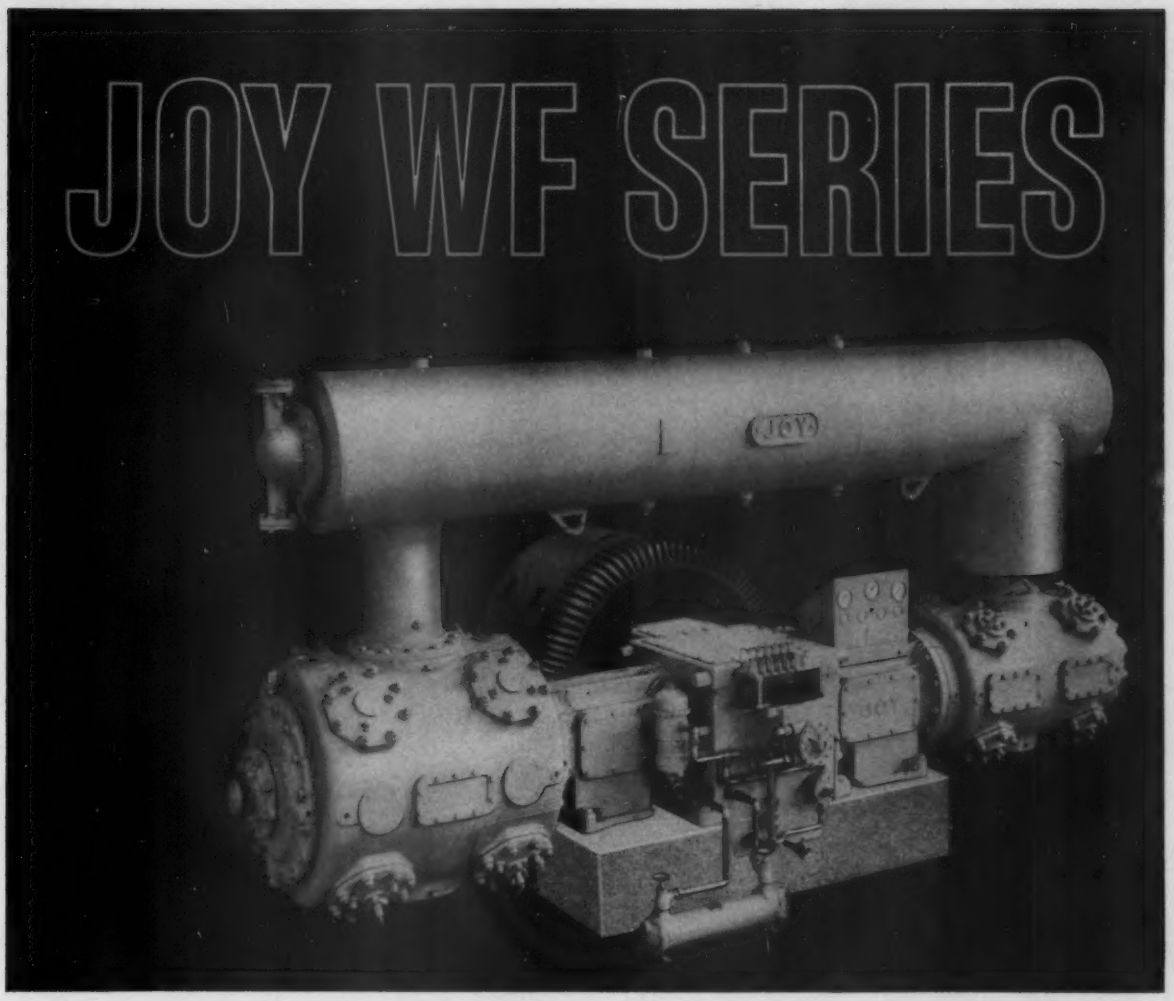
Where heavy coats are required on gates and runners, the material is brushed on thinly until the desired thickness is built up. Properly applied coatings should serve through an operating shift with only minor touch-ups.

Flame Hardening

Can you supply any information on a gray iron composition which can be flame-hardened to a hardness of approximately 500 Bhn? If alloys improve the flame hardening qualities, will you indicate what they are and the amounts involved?

Since foundry practices as well as the compositions of iron employed vary considerably from foundry to foundry, no definite answer can be given to your question. Composition of the iron must be related to

JOY WF SERIES



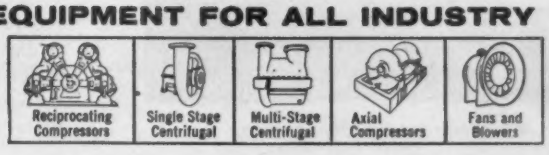
Announcing A Series of Horizontal Opposed Compressors in the 300-2000 HP Range

Designed for the great bulk of industrial air and gas applications, the WF series is the result of Joy's experience with over two and one half million compressor horsepower in the field. Every component is designed for dependability and ease of maintenance.

Installation and maintenance costs of the WF series are held to a minimum due to superior design. Since the motor rotor is mounted directly on the compressor shaft, alignment problems are minimized, installation is simplified, and less floor space is necessary.

The WF-102 air compressor pictured above has a displacement of 1972 CFM, and is driven by a 300 HP motor when discharging at pressures up to 125 PSIG. Larger models of Joy horizontal opposed compressors are also available as well as vertical, V-vertical, and turbodynamic machines. For additional information on the WF series write for Bulletin 3369-13.

AIR MOVING EQUIPMENT FOR ALL INDUSTRY



JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

section size, and one suitable for a 1-in. section will not be satisfactory for a 3-in. section.

Both plain and alloy gray irons can be flame hardened. The latter usually are preferred because they can be treated over a wider range of temperatures, and the depth of hardness as well as the final hardness may be increased. The most satisfactory results in flame hardening generally are obtained with low-silicon, low-carbon irons which have a predominantly pearlitic structure.

Indications are that a plain gray iron containing 3 per cent TC, 1.7 per cent Si, and 0.6 to 0.8 per cent Mn will provide a surface hardness of 400 to 450 Bhn when flame hardened, but hardnesses over 500 have been obtained. No doubt the flame-hardening practices have a bearing on the results.

For ease of control and consistent results, we believe it is advisable to use an alloy iron. Possibly additions of about 0.30 per cent each of Ni, Mo, and Cr might serve, but again consideration must be given to section size and other properties desired.

Plaster Molding of Aluminum Alloys

In the July issue in the Questions and Answers department you suggested use of the plaster molding process for making bells. We are interested in casting aluminum alloys in plaster molds, and would like to know whether there are any books or publications on that application. We would like to have information on the type of plaster, dimensions of molds, gates, risers, baking time, etc.

Although we do not know of any book on the plaster molding process a number of articles on the subject have been published in FOUNDRY. They include the following: "Casting in Plaster Molds" —March, 1944; "Pressure Casting Aluminum Matchplates" — July, 1945; "Pressure Casting Matchplates" — April, 1947; "Pressure Casting Aluminum Matchplates in Plaster Molds"—July, 1948; "Plaster Molds Give Close Tolerances" —January, 1951; "Statuary to Electronics via Plaster Molding"—September, 1952; "Antioch Process for Plaster Molding"—November, 1955.

Plaster molding is not too difficult, but like any other process some experience is necessary. Close attention to details is required in the various steps to obtain smooth surfaces and close dimensional tolerances. Patterns should be as accurate as possible and have the proper shrinkage for the alloy and casting plaster used. Data on shrinkage can be obtained from the sources of supply.

Usually patterns are made of brass for production work. Aluminum is not as satisfactory since it is claimed that the surface is somewhat porous, and as plaster reproduces fine detail any surface blemishes on the pattern will appear on the castings. The plaster used for making castings is a mixture of gypsum cement or plaster of paris, fibrous talc, and water. The plaster and talc may be purchased separately and mixed, but the mixed or prepared material is available as "casting plaster," and we believe it is preferable to obtain it in that form.

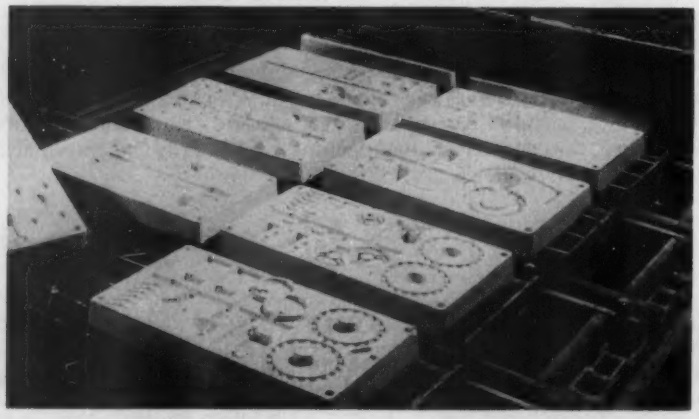
Manufacturers' directions on mixing should be followed carefully. Usually the proportions are 1 lb plaster and 1.7 lb water—the plaster always being strewn into the water. Mixture is stirred with a mechanical mixer for a period of time determined by experiment until it assumes the consistency of thick cream. Factors such as purity of the water used, its temperature, and the characteristics of the mixer affect mixing time.

Flasks may be wood or steel and must have smooth sides so that the mold can be removed without trouble. Interior walls of the flask and the pattern are given a thin coat of an oil-wax separating medium, and the liquid plaster poured in preferably from one corner or side to avoid air bubbles on the pattern face or in the plaster. Vibration of the molds to insure bubble removal is desirable.

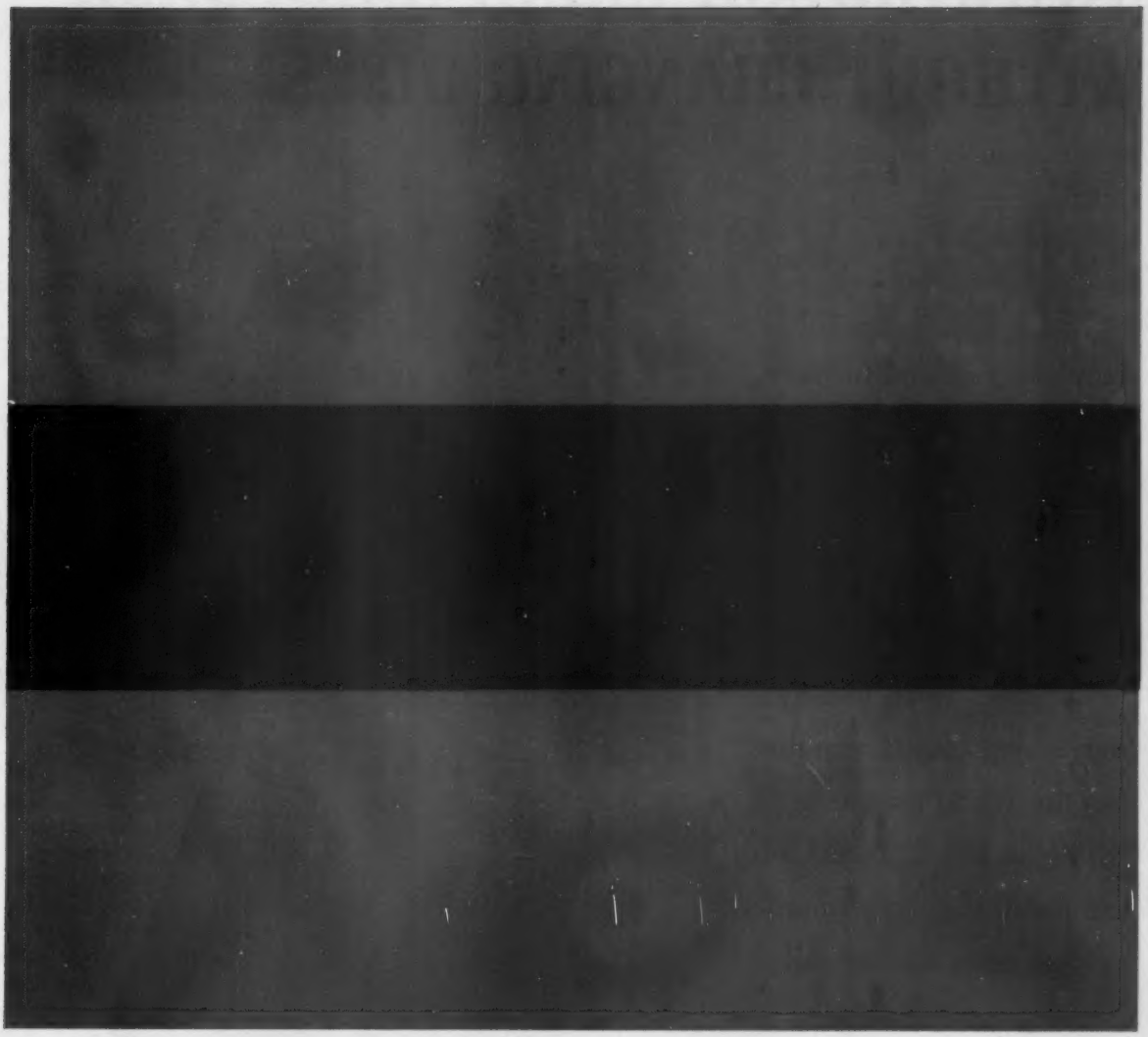
The wet mold is allowed to stand for 15 to 30 minutes to permit the plaster to set or harden, then it is removed from the pattern, and finally from the flask. While the mold still is moist, it can be handled. The moist mold is placed in the oven to dry at temperatures from 600 to 1300° F, the time for drying depending on the temperature. At the low temperature the time will range from 8 to 10 hours or more, depending on the thickness but at the high temperature drying can be accomplished in 2½ hours or so.

Molds usually are allowed to cool to about 300° before removing from the oven, and are filled with molten metal while they still are warm. If they are allowed to become cold they tend to pick up moisture, and sometimes crack.

Your question on mold size is not clear. So far as we know there is no size limitation, and it will depend on the size of the casting being made. Gating and risering in plaster molds is similar to any other molding medium. Possibly because the plaster is an insulating medium and the molds are poured while they are warm, the gating system might be somewhat smaller than in sand, but that would have to be determined by experiment.

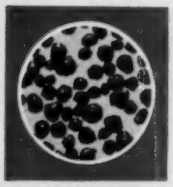


These plaster molds are ready for the drying oven



TERMCO AND METAL DON'T MIX

TERMCO—the new, hard, round-grain carbon sand—is solid, inert carbon. It's not wettable by molten metal. Has no sintering point. And expands only ⅛ as much as silica sand! As a result, there's no veining, scabbing, penetration or burn-on. Castings just naturally come cleaner, more accurate, precise. That's why TERMCO cores and molds are the most dependable—especially for the most difficult casting jobs. And TERMCO replaces zircon sand at half the net cost. It weighs only ⅖ as much as zircon and gives you 132 more gallons per ton! Requires no special methods or equipment. Why not get all the facts on TERMCO—now! Send today for more information.



UNRETOUCHED MICROPHOTO

New Molding Medium for Highest Quality Castings

TERMCO®

HUMBLE OIL & REFINING COMPANY • DETROIT 18, MICHIGAN • U.S. PATENT NOS. 2833342, 2830913.

For More Information Circle 602, Page 39

NOW... ROUGH GRIND AND FINISH WITHOUT CHANGING DISCS

• • • get up to 20 times longer life with new flexible MX® Discs.

Now you can end forever the costly, time-consuming annoyance of changing discs between roughing and finishing. To take off metal rapidly with the new flexible MX® disc, simply bear down—watch the disc hug the workpiece as it grinds off stock. Then let up and finish the job with an easy smooth motion—all with the same disc! Use this remarkable new abrasive tool on flat work or on contours. Use it to remove welds, take out dents and imperfections—for hundreds of jobs on regular steel, stainless or aluminum. Your Carborundum distributor or representative will be glad to help.

Bonded Abrasives Division • Niagara Falls, N. Y.

CARBORUNDUM

For More Information Circle 603, Page 39

For More Information, Use Reader Service Card—Page 39

GAS BURNERS

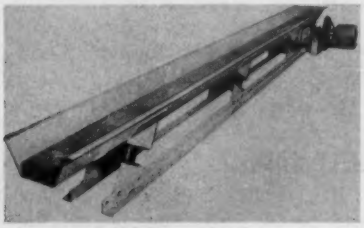
Gas burners are designed to create a flat, spiral flame which hugs the arch and/or walls of heat treat

furnaces. A radiation effect, caused by the flame scrubbing large areas of the furnace wall, increases overall heat transfer rates. Work can be situated close to the burner without danger of flame impingement or hot spots. Six sizes of burners provide capacities from 100,000 to 1,800,000 Btu/hr with flame diameters ranging from 13 to 60 in.—**Eclipse Fuel Engineering Co.**, Rockford, Ill.

For More Details Circle No. 451—Page 39

VIBRATING CONVEYORS

Vibrating conveyors employ rubber mounts instead of coil or leaf springs to support the troughs and absorb and isolate the material and



trough contact effect. These conveyors can be used to convey materials such as sand or even large hot castings. The rubber mounting system is said to assure low cost, trouble-free operation. — **General Kinematics**, Barrington, Ill.

For More Details Circle No. 452—Page 39

GOUGING NOZZLES

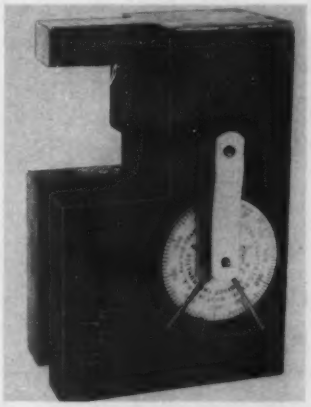
Two-piece gouging nozzles, Series 1542, are designed for use with natural gas and propane and incorporate slotted internal nozzle with external sleeves. The slotted design is said to provide a greater number of individual small flames with high gas velocity to produce a high-intensity flame. Internal surface of the copper external sleeve and brass internal section are chrome plated for improved corrosion resistance and longer service life. Nozzles are available in bent or straight form. Internal and ex-

ternal sections of the nozzles can be separated for maintenance and removal of slag.—**Linde Co.**, division of Union Carbide Corp., 270 Park Ave., New York 17, N. Y.

For More Details Circle No. 453—Page 39

SURFACE THERMOMETER

Surface thermometer, made of stainless steel, can be used to measure temperature of dies, furnace skins, castings after shakeout, etc. Within 60 sec after the unit is placed on the surface to be checked, it gives temperature readings. Accessories available include an alnico magnetic clip to enable use of the thermometer on non-horizontal ferrous surfaces and a set of auxiliary

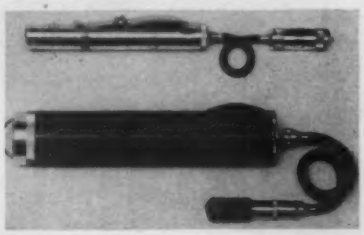


pointers (see illustration) which record maximum and minimum temperatures attained during a measuring period. Temperature ranges available include 50 to 1000° F, 50 to 500° F, 0 to 540° F, 0 to 320° F, and 0 to 270° F. All units are calibrated to within plus or minus 2 per cent and can be reset by the user. Diameter is 1¾ in., and weight is 1/3 oz.—**Pacific Transducer Corp.**, 11836 W. Pico Blvd., Los Angeles 64, Calif.

For More Details Circle No. 454—Page 39

INSPECTION FLASHLIGHTS

Inspection flashlights are available for inspecting castings in foundries and for use by maintenance men



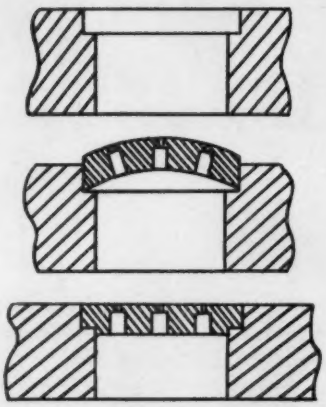
and machinists. Series 300 uses pen light batteries and can be carried safely in pockets because of a clip-lock feature. This model is avail-

able with 6, 12, 18, and 24-in. extensions. Series 200 is for general inspection and uses two size D batteries. It is available with 9, 18, 27, and 36-in. extensions. Model 500-A is similar to Series 200 but includes combination rigid and flexible extensions for 20-in. over-all length. All models have a $\frac{5}{8}$-in. diam head.—**Aero Motive Mfg. Co.**, 1803 Alcott St., Kalamazoo, Mich.

For More Details Circle No. 455—Page 39

HOT COREBOX VENTS

Vents are for use in hot coreboxes. Each is saucer-shaped and is filled with 0.010-in.-diam holes. Stock sizes offered range from 3/16 to $\frac{3}{4}$ in. Vents are installed by first drilling holes 1/16 in. smaller than the vent diameter. Holes are counterbored to nominal size, 3/64 in. deep (top illustration), and vents are installed (middle), flattened with a hammer or press, and polished with file, grinder, or scraper (bottom). Changes from room temperature to 500° F are said not to loosen these vents.—**Martin Engineering Co.**, Neponset, Ill.



For More Details Circle No. 456—Page 39

VEINING PREVENTIVE

Cushionite is an alumina-silicate material available in the form of sand or for use in gray iron and malleable foundries to reduce veining faults. The material is said to form a plastic glaze or slag which fills the voids between sand grains to prevent penetration of metal.

Grain distribution of the material is similar to that of many classified sands. Thus, with 10-20 per cent of the base sand replaced by this material, no special adjustments are necessary when a conventional core mix is made. The flour grind is used in amounts of 2-5 per cent. Both sand and flour are suitable for oil-bonded, air-setting, nonbaking, and shell cores and molds. — **Archer-Daniels-Midland Co.**, Federal Foundry Supply Div., 2191 W. 110th St., Cleveland, Ohio.

For More Details Circle No. 457—Page 39

WELDING TORCH

Model 63-F heavy-duty, equal pressure oxyacetylene welding torch features high temperature O-ring seals that permit fast, easy changes of tip assemblies. The torch's universal-type mixer accommodates the company's first 12 tip sizes; tip assemblies 15, 19, and 22 have individual mixers for maximum safety. The S-43-4 multiflame heating assembly can be used with the unit as can a cutting attachment that cuts up to 6 in. The torch has a handle diameter of $1\frac{1}{8}$ in., and it is furnished with three welding tips. —**Harris Calorific Co.**, 5501 Cass Ave., Cleveland 2, Ohio.

For More Details Circle No. 458—Page 39

STOPPER HEAD ASSEMBLY

Stopper head assembly for steel pouring consists of a threaded insert and threaded cap which are screwed together to fasten the assembly to a forged flange on one end of the stopper rod. Lost heads while pouring are said to be eliminated, and economies are effected because of a reduction in the number of parts and longer rod life. The diameter of the stopper head used depends on heat size and may vary from 5 in. to 8 in.—**Vesuvius Crucible Co.**, Swissvale, Pa.

For More Details Circle No. 459—Page 39

BELT SANDER

Belt sander is designed to sand and blend inside contours on die-castings. Speed of 6200 fpm is provided by a governed motor. The belt is supported by a high-strength aluminum casting, an adjustment is

Vibratory Finishing Machines Are Automatic

Automatic continuous vibratory finishing machines are offered for cleaning, descaling, deburring, radiusing, grinding, fine finishing, coloring, and burnishing. Work may be fed or conveyed automatically into and out of these machines. Media are automatically cleaned, screened, and recirculated, and compound and water also are added aumatically.

If it is required, continuous conveyance of fixtured large and heavy parts through the machines can be arranged, or the elongated work containers can be adapted to batch-type processing of very long parts. These continuous process machines use the same gyratory action and air-cushion suspension as the company's standard-type units. They are available in a range of sizes. **Pangborn Corp.**, Hagerstown, Md.

For More Details Circle No. 486—Page 39

Circle 604, Page 39→

Tramp elements begone!

GLOBE SILVERY IRON is virgin metal produced in a blast furnace from natural iron ores. Tramp elements are therefore at a minimum.

Closer chemical and physical control in the cupola is possible when Globe Silvery is used and you avoid the need for highly concentrated alloy additions.

P M

PICKANDS MATHER & CO.

Cleveland 14, Ohio

Chicago • Cincinnati • Detroit • Duluth
Erie • Greensboro • Indianapolis • New York
Pittsburgh • St. Louis • Washington

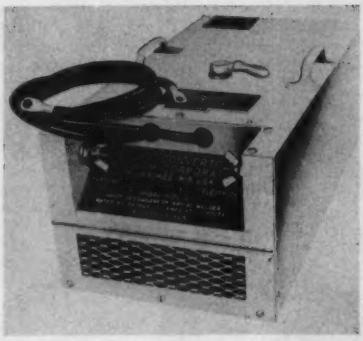
Iron Ore • Pig Iron • Coal • Coke • Ferroalloys
Lake Fueling • Lake Shipping

included for positive belt tracking, and belt tension is maintained by a spring at 40 lb maximum. Pulley diameter is 2 in. with a center distance of 13⅝ in. between pulleys. Weight is 9 lb, and the unit uses 1 to 2-ft wide belts.—**Rotor Tool Co.**, 26300 Lakeland Blvd., Cleveland 32, Ohio.

For More Details Circle No. 460—Page 39

WELDER CONVERTERS

Converters are said to change any ac welders to dc output. Two silicon rectifier converter models are available. One is rated at 300 amp during a 40 per cent duty cycle or 250 amp during a 60 per cent duty cycle; the other is rated at 500 amp during a 45 per cent duty cycle or 450 amp at a 60 per cent duty cycle. Either unit is placed atop or on the side panel of an ac welder of any amperage for temporary, intermittent, or permanent operation. The lower rate model weighs 100 lb, and the higher rated converter weighs 110 lb. Only two cable connections are required, and a polarity switch on the converter permits selection of output—straight dc, reverse dc, or ac—with no lead handling necessary. Each converter is fan cooled and utilizes standard fuses, replaceable through a hinged front panel.—**A. O. Smith Corp., Welding Products Div.**, 3533 N. 27th St., Milwaukee, Wis.



For More Details Circle No. 461—Page 39

BRONZE ALLOY

Bronze alloy NDZ was developed for applications requiring high strength and resistance to dezincification and dealuminumization. It is for sand casting and contains the following maximum amounts of elements: 0.25 per cent lead, 7.00 per cent zinc, 5.50 per cent iron, 2.00 per cent aluminum, and 2.00 per cent silicon. Its minimum mechanical properties are 60,000 psi ten str, 30,000 psi yld str, and 12 per cent elong. Machinability is about equal to that of silicon brass, and electrical conductivity is similar to that of manganese bronze. The alloy can be melted by ordinary melting practice, and pouring temperature range parallels that of aluminum bronzes. Typical gating and risering practice is used in molds, which can be of green sand or oil sand.—**R. Lavin & Sons Inc.**, 3426 S. Kedzie Ave., Chicago 23, Ill.

For More Details Circle No. 462—Page 39

CUTOFF GRINDING WHEELS

Cutoff grinding whee's are for cutting steel, gray iron, aluminum, nickel, brass, and Stellite. A new bonding agent and a new additive are used in the formulation to produce freer cutting, less burning, and freedom from burrs. The wheels also resist deterioration by water vapor and coolant.—**Peninsular Grinding Wheel Co.**, 729 Meldrum Ave., Detroit 7, Mich.

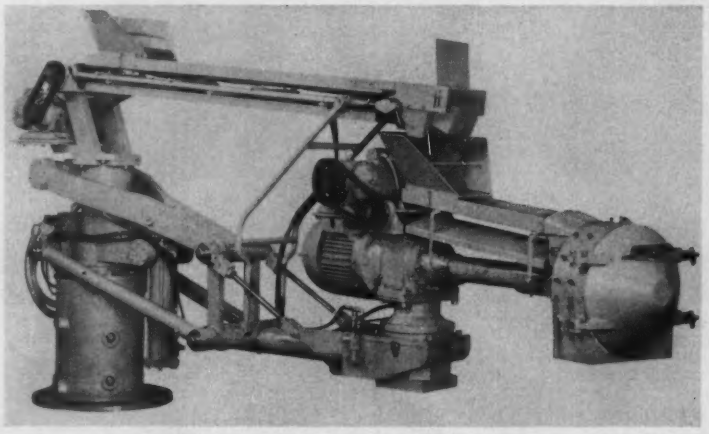
For More Details Circle No. 463—Page 39

OVERHEAD CRANE

Overhead traveling crane features a pressurized, lighted passageway inside the main girder and a pressurized control cab. With internal pressure about 2 psi above atmospheric, all control and power components, which are mounted inside the passageway, as well as the operator, are protected against dust seepage and heat accumulation.

Mounting the electronic control and power components inside the passageway, which is 8 ft high by 5 ft wide and extends almost the full length of the crane, makes them readily accessible to maintenance

Sand-throwing Machine Makes Large Molds



The Sandpacker is a variable-height, hydraulically operated unit of the sand-throwing type, designed primarily for use in making large sand molds. First of what the company expects to be a complete line, it has a mold ramming capacity of about 40 tons per hour.

The machine is constructed to rotate 270 degrees, with over-all arm length available from 10 to 15 ft. Ram speed is either 1200 or 1800 rpm. Two belt speeds, delivering either 15 or 20 cu ft of sand per minute, permit the operator to co-ordinate sand delivery speed with ram speed. The ram is adjustable in height from 2 ft 9 in. above the floor to 6 ft 4 in.

The stationary unit is controlled from a console mounted near it and manned by an operator who has complete control of the machine's operation. The unit features a coupling linkage between the impeller motor and the impeller shaft permitting removal of separate components of the motor drive system for repair. —**Osborn Mfg. Co.**, 5401 Hamilton Ave., Cleveland 14, Ohio.

For More Details Circle No. 487—Page 39

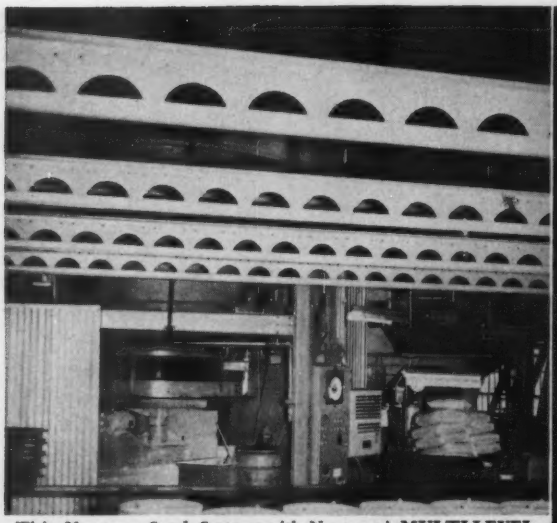
WEDRON

SILICA SANDS

99.9% PURE SILICA
WEDRON
SILICA COMPANY
INDUSTRIAL SAND

WEDRON SILICA COMPANY • 135 So. La Salle Street, Chicago
MINES AND MILLS IN WEDRON, ILLINOIS

For More Information Circle 605, Page 39

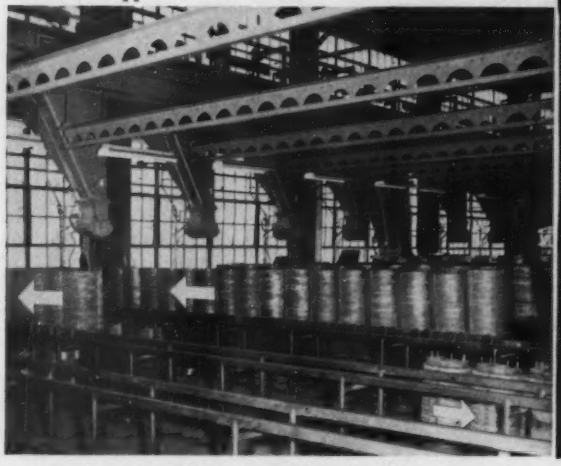


This Newaygo Sand System with Newaygo's **MULTI-LEVEL CONTROL,** installed recently at **SEALED POWER CORPORATION,** Muskegon Heights, Michigan automates a high production system for small gray iron castings suitable for a stack molding process. Circular sand storage bin, with Newaygo Plate Feeder, feeds sand to skip hoist for loading the muller. Operations from tank, through muller to distribution belt, are controlled by the Newaygo specially designed combination Motor Control and Multi-Level Panel, which works in conjunction with a No. 3917 Dietert "End Point" Moisture Controller and Automull. This allows fully automatic operation of sand handling system, from shakeout to molders' hoppers.

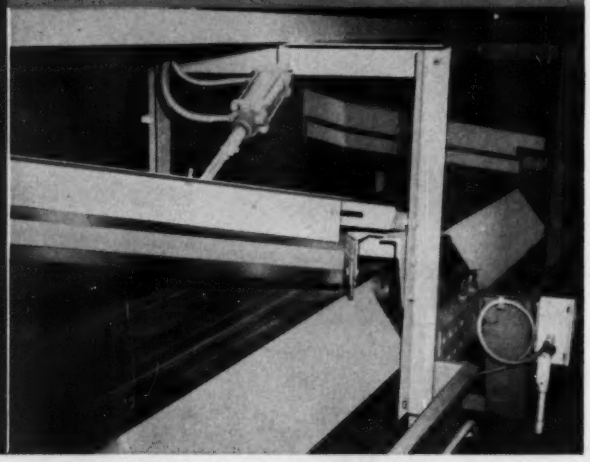
Foundries step up ***QUALITY*** *of castings and* ***QUANTITY*** *of molds with* **NEWAYGO** *equipment!*

More molds ON THE MOVE make money! Automation by Newaygo keeps molds on the move!

Here's MORE proof of Newaygo's Leadership in "packaged" sand handling units!



Portion of the 12-hopper molding line. This is a stack molding operation, with empty flasks returning to molder on dolly cars at high level. The same dolly cars are used to take a stack of unpoured molds through the pouring zone, with tracks at floor level.



Each hopper has fully automatic sand filling through the use of the Newaygo Multi-Level Control System.

"The automation of our small casting department has more than doubled our capacity in the same floor space. We have made significant cost reductions and have attained a high and predictable level of quality. Newaygo has contributed excellent equipment plus engineering assistance and know-how to make this program a success." — John A. VanHaver, Foundry Manager, Sealed Power Corporation.

Write, phone or wire for a Newaygo Representative to help you.

These will help YOU

MOVIE "Progressive Mechanization" featuring HANDY SANDYS in 9 foundries . . . . . MOVIE "Newaygo Pallet Systems for Mold Handling", many types of installations in foundries . . . . . Our magazine "SAND SCRIPTS" . . . . . Bulletins: No. 60 on Pallet Line Systems of Mold Handling . . . . . No. 59 on HANDY SANDYS . . . . . No. 56 on Newaygo Sand and Mold Handling and Mold Making Equipment

Performance and durability are built into every piece of NEWAYGO equipment.

NEWAYGO engineering company
NEWAYGO, MICHIGAN

. . . and profitable, too, with NEWAYGO MOLD HANDLING, SAND HANDLING AND CONDITIONING EQUIPMENT

Also Manufacturers and Installers of MULTI-LEVEL HOPPER CONTROL SYSTEMS, CAR CONVEYORS, APRON CONVEYORS, ROTARY FEEDERS and FOUNDRY AUTOMATION

crews. A small electric hoist, suspended on an I-beam track, runs the length of the passageway and enables repairmen to lift tools from the main floor below through a dustproof hatch. Pressurization is maintained by a small blower, which screens air through self-cleaning wool bag filters.

The operator's cab is attached beneath one end of the main girder and provides ample visibility. In addition to being pressurized, it features a combination cool-or-heat air conditioner.—**Harnischfeger Corp.**, 4444 W. National Ave., Milwaukee 46, Wis.

For More Details Circle No. 464—Page 39

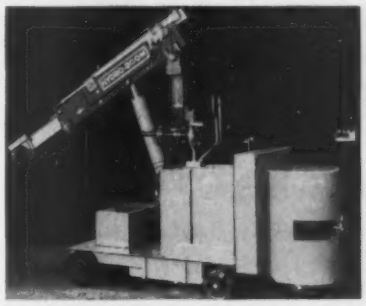
CORE AND MOLD WASHES

Core and mold washes are said to offer better suspension and require no special solvents other than alcohol. Igni-Bond G, a combination of refractory minerals and graphite, is used for coating cores and molds in all applications except those requiring a carbon-free coating. For these applications, there is Igni-Bond S. Heat-resistant Igni-coat X is a graphite coating to be applied where more accurate surface and a smooth finish are required. The washes are claimed to improve finish, reduce sand peel, save time and labor in drying, remix easily, and flatten out rapidly.—**Frederic B. Stevens Inc.**, 1800 Eighteenth St., Detroit 16, Mich.

For More Details Circle No. 465—Page 39

MOBILE FLOOR CRANE

Mobile floor crane, Model 135, is a highly maneuverable, self-propelled unit which can make a complete turn within a distance equal to its own diagonal length. No straddling of a load is necessary because the hook extends beyond the front of the truck. When extended



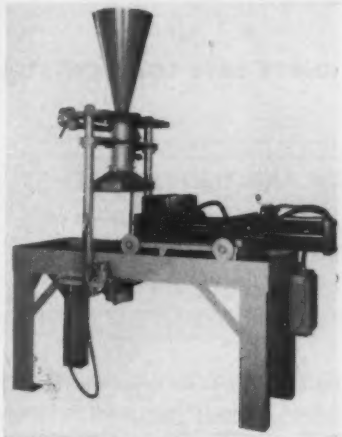
48 in., it can lift 3000 lb. Hydraulical control of boom movement permits close control of the hook in up-down, in-out, and right-left directions. The crane is suited for changing dies, molds, grinding wheels, motors, and in general maintenance applications. — **Vanguard Mfg. Co.**, 1908 E. 66th St., Cleveland 3, Ohio.

For More Details Circle No. 466—Page 39

Coreblower Makes Shell or Furfural Cores

Line of coreblowers is suitable for both phenolic resin and furfural sand. Model 300-CF will accommodate coreboxes up to 16 by 16 in. while Model 300-BF has a capacity for coreboxes up to 16 in. wide by 10 in. high. Quick-change clamps and a universal blow plate are said to permit operators to set up coreboxes in a minimum of time.

Units are available with electric or gas heat, and they may be obtained with controls for manual, semiautomatic, or fully automatic operation. A water-cooled, quick-change blow plate, temperature controllers, air regulator, air gun, and hose are included with each unit. A double-station model is available for



foundries requiring greater production.—**Harrison Machine Co.**, 2725 Station Rd., Wesleyville, Pa.

For More Details Circle No. 488—Page 39

INSULATING FIRE BRICK

Insulating fire brick will withstand prepared atmospheres in furnaces including CO, H_2, and CH_4. Suitable for direct exposure and backup insulating, the two grades available are JM-23 for service up to 2300° F and JM-20 for service up to 2000° F. Both are made from clays with low iron content and feature light weight, uniform pore structure, low heat storage capacity, and low thermal conductivity. Sizes offered include all standard 9-in. shapes of the 2½ and 3-in. series as well as special shapes. All bricks are packed 20 to a carton.—**Johns-Manville**, 22 E. 40th St., New York 16, N. Y.

For More Details Circle No. 467—Page 39

WATERLESS HAND CLEANER

Waterless hand cleaner was developed to clean hands of coreroom workers, but also will remove other types of soil such as grease and paint. The cream-like material contains lanolin and hexachloroprene. It is offered in 1-gal cans which contain 7½ lb and provide over 1000 applications. A dispenser is offered to fit the can.—**Industrial Div., G. E. Smith Inc.**, 4 W. Manilla Ave., Pittsburgh 20, Pa.

For More Details Circle No. 468—Page 39

RISER SLEEVES

Insulating riser sleeves for use with aluminum, brass, bronze, and magnesium are made of permeable plaster in 2 and 3-ft lengths. For each job, a riser sleeve is cut to the particular length required. Spiral-wound paper which covers the outside of each plaster tube reduces contamination of molding sand and also reduces breakage during shipping. Sleeves are offered with inside diameters ranging from 1½ to 6½ in.—**Dalton Co., Orchard Rd.**, Wheaton, Ill.

For More Details Circle No. 469—Page 39

ALUMINUM CLEANER

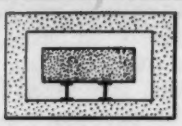
Aluminum cleaner, NS-35, removes light oil, marking inks, and light buffing compounds. It is a powdered material which is dissolved in water in concentrations of 2-8 oz per gal. At operating temperatures below 150° F, it does not etch aluminum; above 150° F, a mild, controlled etching can be accomplished. It has good deter-

use these handy FANNER selection charts to

FACTORS TO CONSIDER IN SELECTING CHAPLETS

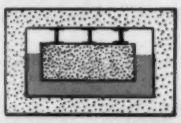
1 CALCULATE WEIGHT OF CORE

Purpose of chaplets in the drag side of mold is merely to hold core weight until metal is poured. Core weight = .06 lbs. per cu. Inch of Core



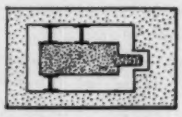
2 CALCULATE LIFT OF CORE

Purpose of chaplets in the cope side of mold is to withstand lift exerted by metal, which is 3.5 times the weight of the core for grey iron and 3.9 for steel. Core weight x 3.5 or 3.9 = Lift of Core



3 COMPENSATE FOR PRINTS AND SUPPORTS

Where prints or supports exist, load calculations should be reduced proportionately.



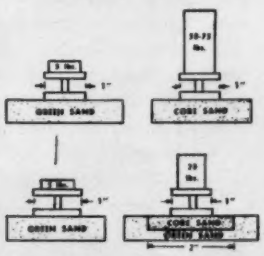
4 CALCULATE SUPPORTING CAPACITY OF SAND

Green sand in cope and drag will support approximately 5 lbs. per Sq. Inch. To determine required head area, divide load by 5 lbs.

$$\frac{\text{Load on Chaplet}}{5 \text{ lbs.}} = \text{Sq. Inches of Chaplet Head Area Required}$$

Baked Sand Cores will support 50 - 75 lbs. per Sq. Inch. To determine required head area (or bearing surface), divide load by 50 - 75 lbs.

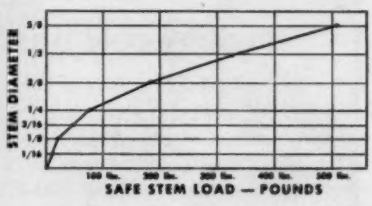
Where cores are so heavy that an excessive number of chaplets would be required, ram-up cores may be used to increase the bearing surface of green sand. For example: A chaplet with 1" head in green sand will support only 5 pounds. A 2" ram-up core (4 Sq. Inches) will provide a bearing surface to support 4 times 5 lbs., or 20 lbs.



5 CALCULATE SUPPORTING CAPACITY OF SAND

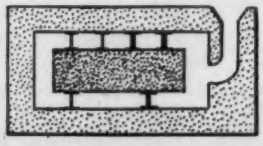
$$\frac{\text{Required Head Area (Sq. In.)}}{\text{Area of Each Chaplet Head (Sq. In.)}} = \text{Number of Chaplets Required}$$

6 USE THIS CHART TO CHECK SAFE LOAD ON STEM



7 CONSIDER EFFECT OF LOCATION AND TEMPERATURE

When chaplet location is near the gate (heavy flow of metal), or, when steel is poured at high temperatures, allow up to 50% additional stem size to compensate for effect on chaplet.

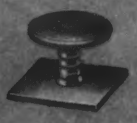
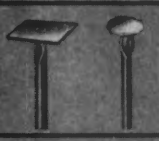


The chaplet you select for any casting can make a great difference in its quality . . . and in its overall costs. Too light or too small a chaplet may result in improper core support and a poor casting, too large or too heavy a chaplet increases chaplet costs unnecessarily. Use this graphic information to determine the correct chaplet to insure proper core support.

✱ Write for free plastic laminated selection chart of chaplets.

insure proper selection of proper type of chaplets for your job

fine FANNER CHAPLETS are made in a wide range of types for every need

TYPE	CHARACTERISTICS	APPLICATIONS
MOTOR	FUSE READILY STEMS CAN BE GROOVED HEADS CAN BE PERFORATED HEADS CAN BE TILTED STEMS CAN BE EXTENDED CLOSE TOLERANCES ±.002	***For Light Sections of*** **Motor Blocks • Heads • Housings Radiator Sections • Burner Sections • Pump Sections • Farm Equipment • Job Castings**
BUTTON HEAD OR BOILER 	STURDY STRUCTURE FUSE READILY STEMS CAN BE GROOVED NON-SLIP BUTTON HEAD	***For Boiler Sections***
PERFORATED	10 STANDARD SHAPES MADE TO FIT ALL CONTOURS MADE TO ALL RADII DESIGNED FOR WEDGES LOW IN COST	***For Light Sections of*** **Stove Castings • Motor Castings • Job Castings**
DOUBLE HEAD	STURDY STRUCTURE STRONG SUPPORT TO CORE STEMS CAN BE GROOVED HEADS CAN BE CANTED RIVETED OR WELDED HEADS CLOSE TOLERANCES ±.005	***For Heavy Sections of*** **Machine Tool Bases • Diesel Engines • Locomotive Frames Side Frames • Pumps • Road Machinery**
SINGLE HEAD 	NON-SLIP FORGED HEADS FITTED HEADS WITH ANY RADIUS SOLID SUPPORT	***For Very Heavy Cores of*** **Diesel Engines • Machine Bases**
RADIATOR	UNIFORM BREAK-OFF NICKS DEEP NICKS FOR FIRM KNITTING LOW COST	***For Radiator Sections*** **Burner Sections • Pump Sections Farm Equipment • Job Castings**
SHOULDER RADIATOR	EASY TO PLACE FUSE READILY DEEP BREAK-OFF NICKS STAGGERED NICKS FOR FIRM KNITTING UNIFORM SHOULDERS	***For All Thin Sections of*** **Manifolds • Stove Burners Cylinder Heads**

SPECIFY FANNER GROOVESTEMS TO ELIMINATE LEAKERS

Your best insurance against faulty castings is the GROOVESTEM chaplet with the Countersunk Shoulders, Featheredge Fusion Rings, and Complete Contact Radius Grooves.

When you need chaplets remember that only FANNER makes a complete line for every casting requirement. Regardless of the kind of metal you pour or the type of casting you produce, you can secure the exact chaplet you need from this one source. As a result you always save time . . . reduce costs . . . step-up production when you standardize on FANNER for all your needs.

THE FANNER MANUFACTURING COMPANY

Designers and Manufacturers of Fine Fanner Chaplets and Chills

BROOKSIDE PARK CLEVELAND 9, OHIO

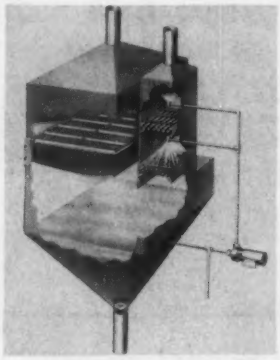
For More Information Circle 607, Page 39

gency in both temperature ranges and does not contain silicates.—**Enthone Inc.**, 442 Elm St., New Haven 8, Conn.

For More Details Circle No. 470—Page 39

AIR SCRUBBER

Air scrubber utilizes a water spray over stainless steel screening to trap



impurities. It features no moving parts, low pressure drop, constant operation, dust recovery as high as 99 per cent, and water consumption as low as 1 gpm per 1000 cfm of air. Each unit is self-contained, and capacities available range up to 50,000 cfm.—**Antipol Corp.**, Galesburg, Ill.

For More Details Circle No. 471—Page 39

LIFT TRUCK MODIFICATION

Modification for company's line of gas-powered lift trucks provides dust protection and is claimed to reduce maintenance and lengthen engine life under dusty conditions. Principal feature of the modification is an air filtering system which includes a dry-type precleaner, an oil bath cleaner, and a final dry-type filter. In addition, the hydraulic system is protected against contamination because the filler cap is a sealed fit and the breather line is connected to the third stage of the air filter. The crankcase is fitted with a forced ventilating system which includes an air intake line from the air filter to the crankcase and an exhaust line from the crankcase to the intake manifold. Other features include a sealed generator and voltage regulator, a heavy duty engine oil filter, and a floor dust deflector plate that is easily demountable.—**Yale Materials Handling Div., Yale & Towne Mfg. Co.**, 11000 Roosevelt Blvd., Philadelphia, Pa.

For More Details Circle No. 472—Page 39

AIR GRINDERS

Series 15 includes 12 grinders which are 16⅝ to 18 in. long and weigh 6½ to 7¼ lb. These models provide free speeds of 6000, 9000, 12,000, or 15,000 rpm and a choice of grip or straight handles and thumb or lever throttles. Features of the units include side-to-center distance of 1-5/16 in., closed-face wheel guard, improved muffler design, weight-type governor, built-in motor lubrication system, and integral air strainer. —**Ingersoll-Rand Co.**, 11 Broadway, New York 4, N. Y.

For More Details Circle No. 473—Page 39

GRINDING WHEEL TRANSPORTER

Grinding wheel transporter is manufactured by Paton-Reynolds Co., Indianapolis. It is designed to be operated by one man and is

adjustable to carry wheels up to 48 in. in diameter. The transporter eliminates lifting grinding wheels to and from carts, reducing damage to wheels and minimizing the possibility of personal injury. Unit consists of a steel frame with rubber covered deck and supports.—**Foundry & Industrial Equipment**, 6341 E. 50th Place, Indianapolis 26, Ind.

For More Details Circle No. 474—Page 39

AIR CYLINDERS

Series C line of air cylinders is designed to operate at a maximum of 200 psi and features units with bore sizes of 1¼, 1¾, 2½, 3⅝, and 4½ in. Single and double-rod end models are offered, and floating cushions designed to reduce impact of stroke can be furnished. Basic mounting positions include side, cap end, or head end, and four mounting attachments can be supplied if desired. Friction is minimized by an oil-impregnated bronze rod bushing which keeps the rod lubricated constantly. A seal simultaneously serves as rod wiper and pressure-adjusted sealing element.—**Hannifin Co.**, Dept. 238, 501 S. Wolf Rd., Des Plaines, Ill.

For More Details Circle No. 475—Page 39

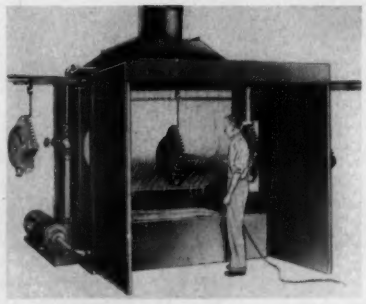
RAILROAD CAR VIBRATOR

Portable, air-powered vibrator is designed to empty railroad hopper cars. It weighs 70 lb and can create a vibratory force of over 1000 lb. A steel wedge head is fitted so that the unit can be mounted on a standard railroad car bracket. The vibrator delivers over 1700 vibrations per minute at 60 psig and will operate on as little as 30 psig air pressure.—**Cleveland Vibrator Co.**, 2828 Clinton Ave., Cleveland 13, Ohio.

For More Details Circle No. 476—Page 39

PAINT SPRAY BOOTHS

Line of water-wash paint spray booths is designed to give production line economy and efficiency on short runs. Each booth features nozzle sprays with overlapping patterns to achieve high speed removal of paint pigments and volatiles. Various sizes are available with optional explosion-proof motors, motor starters, float valves, lights, conveyors, and



exhaust stacks.—**Despatch Oven Co.**, 619 S. E. Eighth St., Minneapolis 14, Minn.

For More Details Circle No. 477—Page 39

POLISHING SUPPLIES

Abrasive supplies are designed for specimen preparation in the metallographic laboratory. Discs (paper and cloth), sheets, rolls, and powders with silicon carbide, aluminum oxide, or emery abrasive, plus boron carbide powder, are included in the

Circle 608, Page 39→

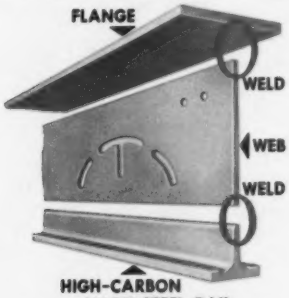
CLEVELAND TRAMRAIL
ANNOUNCES

TARCA TRACK

A MAJOR TRACK DEVELOPMENT FOR OVERHEAD MATERIALS HANDLING

Continuous automatically–controlled welds

Flange, web and rail joined by continuous automatic welds assure reliability.



Hard, raised, long-life treads

Rail especially rolled of high-carbon alloy steel for maximum durability. Treads are extra hard, raised, flat and smooth—for easy load movement—prevent peening—longer wear.

another exciting "first"

An outstanding advancement in a long series pioneered by Cleveland Tramrail to make it the leader in the overhead materials handling equipment industry. An entirely new track that had to be great to be better—result of years of research.

a far better track

Balanced design with parts proportioned exactly to provide maximum strength with minimum weight. Greater rigidity to withstand severe working conditions.

easier, faster to erect

Straight, true, smooth. All dimensions held to greater accuracy. Tarca Track matches with existing Cleveland Tramrail installations.

large range of sizes

10 standard sizes from 8″ to 20″ deep. Special sizes can be fabricated for unusual applications.

Ask for this helpful booklet—No. 2032

Covers all major features the buyer should know about overhead materials handling equipment. Has complete story on Tarca Track. Contains detailed equipment specifications and handy proposal evaluation form.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO
5899 EAST 284th STREET · WICKLIFFE, OHIO

Most Installations of Cleveland Tramrail Equipment pay for themselves within one or two years.

Trade–mark of durability and strength —punched into all Tarca Tracks.

One of the more recent important materials handling developments initiated and engineered by Cleveland Tramrail for the Wire and Rod Industry is the hydraulically-operated grab for storing coils in vertical piles. This device picks up several coils at a time and works in either vertical or horizontal positions.

Simple inexpensive hand-propelled Cleveland Tramrail cranes are filling a mighty important need in a vast number of places. For instance, in this warehouse of a glass distributor, heavy awkward cases are handled by one man and piled high, thereby utilizing the storage space to the maximum.

Cleveland Tramrail gantry cranes have long been popular because they increase efficiency of many local handling situations. They will operate under overhead cranes without interference. Tramrail gantries are built in many types and sizes, with manual or e'ectric drives.

Your Cleveland Tramrail Sales Engineer is Qualified to give you the Complete Design and Application Story on This Revolutionary

NEW TARCA TRACK

Cleveland Tramrail is represented by competent, experienced engineers in all principal cities of the United States and Canada. Contact address on other side.

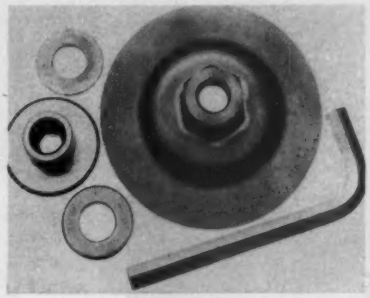
1—Printed in U.S.A.

line. Grit sizes offered range from 40 to 600.—**Geoscience Instruments Corp.**, 142 Maiden Lane, New York 38, N. Y.

For More Details Circle No. 478—Page 39

GRINDING WHEEL ADAPTER KIT

Grinding wheel adapter kit features a cold forged steel flange with a hardened steel adapter nut



brazed on. Contour design of the flange conforms to the recommended standard established by the Grinding Wheel Institute. Cadmium plating is used to prevent rusting. Kits are available with 5/8-in.-11 UNC2B threads.—**Carroll Pressed Metal Inc.**, 133 Dewey St., Worcester, Mass.

For More Details Circle No. 479—Page 39

GRINDING WHEEL

Reinforced grinding wheel with integral mount is designed for light snagging and weld grinding. It is available in 7 and 9-in. sizes to fit standard threaded spindles on portable grinding equipment and combines a saucer-shaped wheel with the convenience of a throwaway mount. The wheel's saucer shape permits the operator to hold the wheel at a closer angle to the work. —**Norton Co.**, Worcester 6, Mass.

For More Details Circle No. 480—Page 39

CASTING REPAIR COMPOUND

Devcon BR is a repair compound consisting of 80 per cent bronze and 20 per cent plastic for filling blowholes and other defects in bronze and brass castings. It is ready to use after mixing with a hardening agent and it is said to harden in approximately two hours without heat or pressure. When hardened, it appears similar to bronze; is unaffected by oil, water, and most chemicals; and can be drilled, ground, or machined. The compound bonds to iron, steel, aluminum, wood, glass, etc., in addition to bronze and brass. Shrinkage during hardening is 0.0005 in. per in., and, because of its high bronze content, the material expands and contracts like metal. It is said to have high impact strength, tensile strength of 9000 psi, and compression strength of 20,000 psi.—**Devcon Corp.**, Danvers, Mass.

For More Details Circle No. 481—Page 39

ABRASIVE BLASTING HOOD

Abrasive blasting hood features a front apron and inner bib made of Duratex rubber which attaches by a zipper to a head and shoulder canopy made of the same material. Either apron or bib can be zipped on or off without replacing the whole canopy. The window opening is 4½ by 5¼ in. and a neoprene

lens retainer supports laminated backup lens, cover lens, and a perforated steel cover plate. The hood is available with a choice of skull cap, hard cap, or nylon headgear with broad bearing cross strap and ratchet adjustment. The air supply system operates at 5 to 25 lb and is controlled by a valve mounted on a belt.—**Chicago Eye Shield Co.**, 2727 W. Roscoe St., Chicago 18, Ill.

For More Details Circle No. 482—Page 39

VISES

Vises in company's 640 Line are available in two sizes. Model 643½ has a jaw width of 3½ in., max opening of 4 in., and jaw depth of 3 in. Pipe capacity of this unit is ⅛ in. to 2 in. and weight is 19 lb. Model 645 has a jaw width of 5 in., max opening of 5½ in., and jaw depth of 3¾ in. Pipe capacity is ⅛ in. to 2½ in. and weight is 34 lb. Features include replaceable hardened steel pipe jaws, replaceable serrated steel top jaws, large anvil, and a 3/16-in. formed steel slide.—**Wilton Tool Mfg. Co.**, 9525 Irving Park Rd., Schiller Park, Ill.

For More Details Circle No. 483—Page 39

ALUMINUM INGOT

Aluminum ingot, called induction furnace grade, is said to be extra clean due to an added step in smelting which removes oxides and similar materials from the metal. Remelting efficiency is improved since ingot minimizes formation of heavy deposits of oxides and other undesirable solids which cover furnace walls and plug tapping channels. Ingot can be used in any remelt operation, although it is designed particularly for induction furnaces. It is available commercially pure or alloyed.—**Aluminum Co. of America**, 782 Alcoa Bldg., Pittsburgh 19, Pa.

For More Details Circle No. 484—Page 39

STEEL PALLET BOXES

Welded steel pallet boxes feature one side of expanded metal for identification of contents and a sliding gate on the opposite side for feeding directly into hoppers. Legs on each box are designed to nest on the box underneath when boxes are stacked. Units illustrated are

30 in. high, 36 in. wide, and 48 in. long. Special sizes and shapes can be supplied.—**Hugh J. Baker & Co., Industrial Div.**, Dept PB-72, 602 W. McCarty St., P. O. Box 892, Indianapolis 6, Ind.

For More Details Circle No. 485—Page 39

←Circle 608, Page 39

Left to right, Major General William K. Ghormley; C. L. Carter, president, Albion Malleable Iron Co.; Governor John B. Swainson of Michigan; William Golden; Major Thomas L. Gunning; John Sagarese; and William J. Pryor, Frankford Arsenal

Army Buys Newly Developed

Pearlitic Malleable 81-mm Shell

Continuous heat treating, ultrasonic testing, and close metallurgical controls are used by this malleable iron foundry to meet rigid specifications for shells

● A NEW PROCESS for producing artillery and mortar shell from pearlitic malleable iron rather than forged steel has been developed by Albion Malleable Iron Co., Albion, Mich.

On July 18, Maj. Gen. William K. Ghormley, commanding general, U. S. Army Ordnance Special Weapons-Ammunition Command, Dover, N. J., and other Army personnel visited Albion for a news conference and to announce that the company had been given a contract for the production of 173,800 rounds of 81-mm mortar shell at a cost of $935,000.

In discussing the developments at Albion, General Ghormley was most complimentary to the company and to pearlitic cast shell. He noted that in addition to providing more effective fragmentation, the new process permits production with basic ingredients, namely scrap, which would not be critical during all-out mobilization. Gov. John B. Swainson of Michigan was present and also praised Albion Malleable Iron Co. and its employees for this valuable development.

Pearlitic malleable iron possesses unusually high damping characteristics and is remarkably resistant to shock, fatigue, and corrosion. These are qualities that must be inherent in casting material used to produce reliable military ammunition. After being subjected to Albion's precisely controlled atmosphere annealing process, the material emerges strong. In the case of shell it is capable of supporting up to 100,000 psi ultimate yield strength.

Close metallurgical control during the production processes provides uniformity of hardness and mechanical properties throughout all sections of the casting and gives the added advantage of good ma-

Left to right, General Ghormley; R. S. Bradshaw, president, Malleable Founders Society; and C. L. Carter, Albion Malleable, listen to an explanation of design of patterns and coreboxes

Worker tests concentricity of a machined malleable shell

Each shell casting is Brinell tested after heat treatment

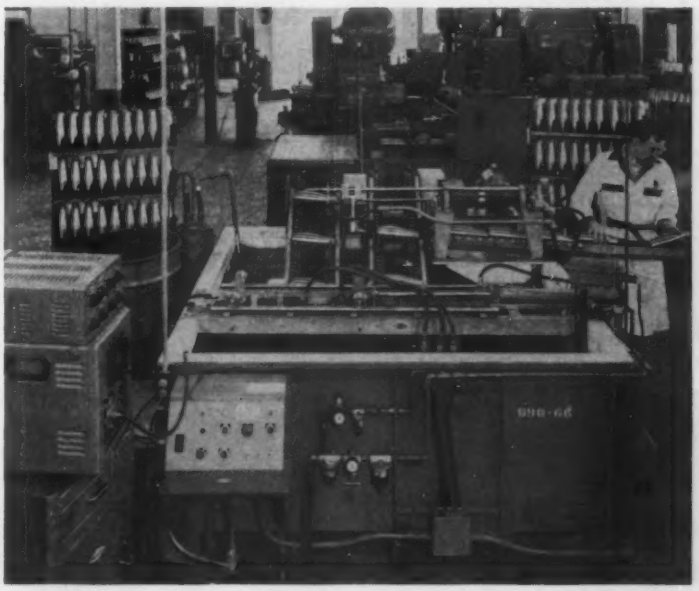
chinability. Good machinability, and the fact that less machine power is required to perform a given machining operation on pearlitic malleable iron than on forged steel, provides a substantial cost advantage for Army Ordnance.

Strength Ratio — Ammunition must have an exceptionally high ratio of yield to tensile strength. Pearlitic malleable iron has an inherent safety factor that permits it to be stressed beyond its rated yield strength. Another advantage as far as Army Ordnance is concerned is the fact that now the metallurgical composition of the iron can be altered at will in a continuous production operation to produce a wide range of special-purpose warheads. Yield strengths varying from 50,000 to 100,000 psi can be obtained by varying the heat treating process.

To develop the process for the production of the 81-mm shell, Albion utilized the facilities of its excellent plant for casting, heat treating, and inspection, although some modifications of normal practice were applied. Castings are produced in a vertical position in a 20 x 30-in. flask. About a quarter of the casting is in the drag, and the remainder is in the cope. The pattern is of manganese bronze.

Shell Cores Used — Resin shell cores, produced on a blower, are used to provide the required smooth interior of the shell. Shell core

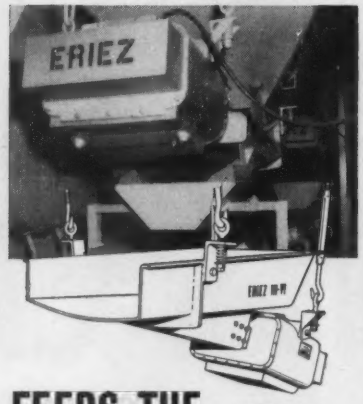
Aerial view of Albion Malleable Iron Co. Ordnance machine shop, below the electric power substation, produces 20,000 machined shells monthly



Fully machined pearlitic malleable shells are tested in this ultrasonic testing machine. Note the conveyors for loading and unloading

ERIEZ Magnetic Minute

60 seconds that will help you improve operating efficiency.



FEEDS THE BIG STUFF WITH ACCURATE CONTROL

PATENTED

AC powered Eriez Hi-Vi Vibratory Feeders move large tonnages of bulk materials with accurate control . . . more efficiently and economically. Illustration shows one of a number of Eriez units available for heavy feeding applications where **big capacity and accuracy** are essential.

Whatever your application, there is an Eriez electro-permanent magnetic feeder that will meet your exact needs. And you get this exclusive combination of advantages: No rectifier needed . . . AC operation. Totally enclosed drive element ideal for hazardous, dusty, wet and corrosive installations. New fibre glass springs assure superior performance and control . . . longer life because spring breakage is practically eliminated.

The full line of Eriez Hi-Vi vibratory feeders includes models with feeding capacities ranging from ounces to many tons per hour.

Write for descriptive bulletin to:

ERIEZ MANUFACTURING CO.
206WA Magnet Drive, Erie Pa.

MAGNA-THOUGHT

Constant research, development and refinement are the keys to new and improved products. New and improved products are the keys to a company's growth.

A. F. ISRAELSON
Chief Engineer

ERIEZ

A GROWTH COMPANY . . .
10 NEW PRODUCTS IN THE LAST 5 YEARS

For More Information Circle 609, Page 39

sand is prepared by mixing bank sand, liquid resin, and accelerators in a high-capacity panned muller to coat all grains uniformly. Heating then evaporates the resin solvent. The prepared sand is passed over a screen to break up any lumps, is cooled, and discharged into a storage hopper. The core is produced by blowing coated sand into a heated cast iron corebox maintained at approximately 400° F. When a shell has developed, the balance of the sand is dumped from the cavity.

Since the casting is open at both ends, core prints at both top and bottom of the mold anchor the core firmly in the mold cavity. Molds are produced on cope and drag machines on one of the four molding lines operated at the plant.

Metal charges are melted in a cupola. Two cupolas, 108 in. in diameter and lined to 72 in., have a melting capacity of 600 tons in 16 hours of continuous operation. Molten metal is tapped into an air furnace of 60-ton capacity for refining and superheating. Close laboratory control results in metal with the following analysis: Carbon 2.40 to 2.50; silicon 1.45 to 1.55; manganese 0.40 to 0.50. Carbon, manganese, and silicon analyses are made every thirty minutes, and sulfur and chromium tests are made every two hours.

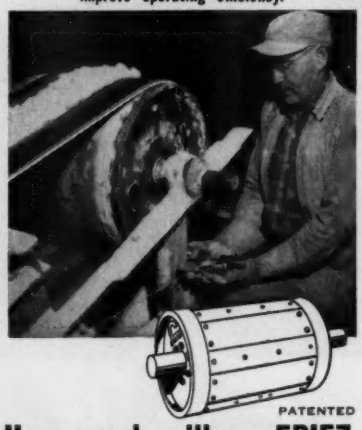
Molds are poured on a continuously moving conveyor line and stay on the conveyor until the metal has solidified completely. After a mechanized shakeout, the castings are dumped into transfer and cooling conveyors, discharged on a spruing belt, sprued, cleaned, trimmed, and transferred to the heat treating department. Special equipment for shot blasting the shell interiors is used.

Continuous Treatment—One of the features of the development is a new continuous heat treating process which reduces annealing time by a full week or more. Improved melting control permits the use of a relatively high-silicon, low-carbon metal to accelerate annealing. This control, plus the elimination of large amounts of packing materials and the almost automatic control of the furnaces, has reduced heat treating to 24 hours.

Heat treating is carried out in electronically controlled, high-capac-

ERIEZ Magnetic Minute

60 seconds that will help you improve operating efficiency.



PATENTED

How much will an ERIEZ PERMANENT MAGNETIC PULLEY save you?

Erium® powered Eriez magnetic pulleys save one firm $1200 a year by removing 50 pounds of tramp iron a week from coarse clay. They can save you as much—or more, depending on your application.

In addition to preventing machinery damage, Eriez permanent magnetic pulleys prevent fires and explosions; assure product quality.

The pulley illustrated is one of 192 sizes (up to 36" diameter in any belt width) made by Eriez. **There is one for your exact application.** Two basic models are available: **Type AA,** ideal for separating small and medium tramp iron and fine ferrous contamination; **Type CR,** which performs best in removing large pieces of tramp iron.

All models are engineered and constructed to give you the finest in automatic separation. All are powered by Erium®—our exclusively-designed power source. Model for model, Eriez units give you the finest quality and consistency of magnetic strength.

For descriptive bulletin write to:

ERIEZ MANUFACTURING CO.
206WB Magnet Drive, Erie, Pa.

MAGNA-THOUGHT

We willingly share our design and application know-how to help our customers find new ways to improve their plant efficiency and product quality.

E. J. TENPAS
Supervisor, Magnetic Engineering

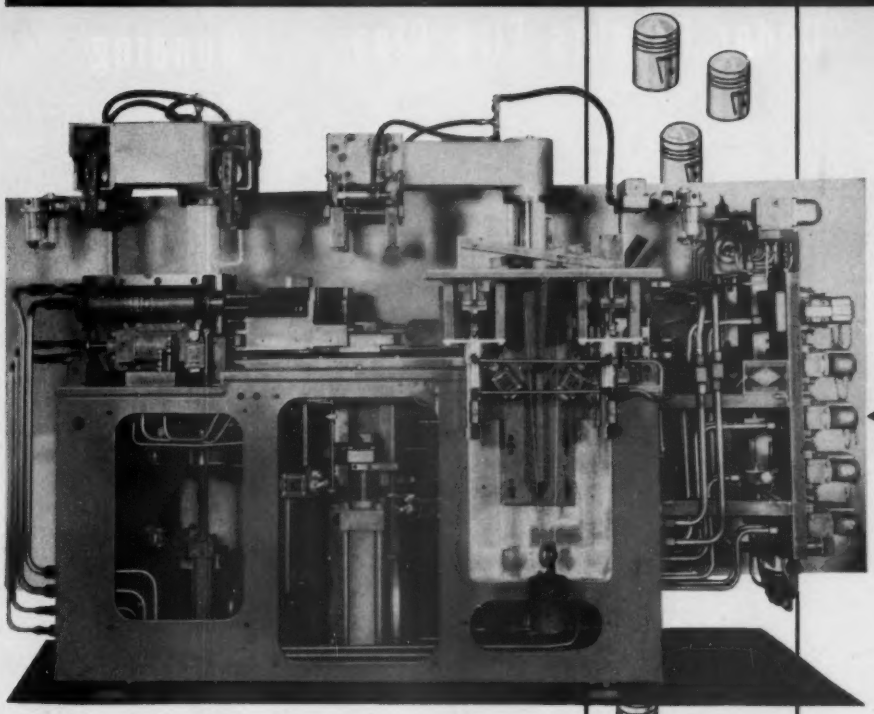
ERIEZ

A GROWTH COMPANY . . .
10 NEW PRODUCTS IN THE LAST 5 YEARS

For More Information Circle 610, Page 39

almost 600%

increase in output with two units . . . and one operator

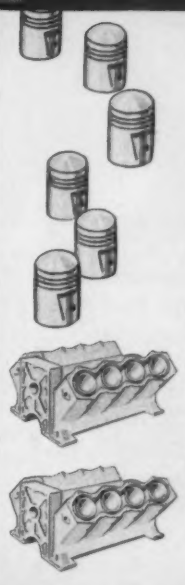


This Automated Piston Molding Machine is typical of the equipment that has been developed for industry by Permanent Mold Die Company, where designing and building special automated molding equipment is an important function.

This machine incorporates the advantages of metal molds and cores, manual or automatic operation, and adaptability to various sizes of pistons. IT HAS INCREASED THE RATE OF PISTON PRODUCTION ALMOST 600%!

The automatic cycle includes insertion of dimension-control bands into the mold, assembly and disassembly of molds and cores, and transfer of completed pistons to customer's chute or belt conveyor. These PMD machines are designed to operate in groups of two, UTILIZING A SINGLE OPERATOR. The operator can pour at one machine during piston solidification at the other. These machines are also adaptable to automatic ladling. Most of the processes of this machine are hydraulically actuated and all the electric, hydraulic, and pneumatic functions conform to Joint Industry Conference Standards.

The machines developed and built by Permanent Mold Die Co., can produce small parts such as pistons, as well as large automotive aluminum castings. This equipment is developed to **your** specifications, to meet **your** particular needs.



PMD

PMD automated molding equipment offers you a wider production potential at relatively low cost. Investigate its advantages for your operation.

PMD

PERMANENT MOLD DIE COMPANY

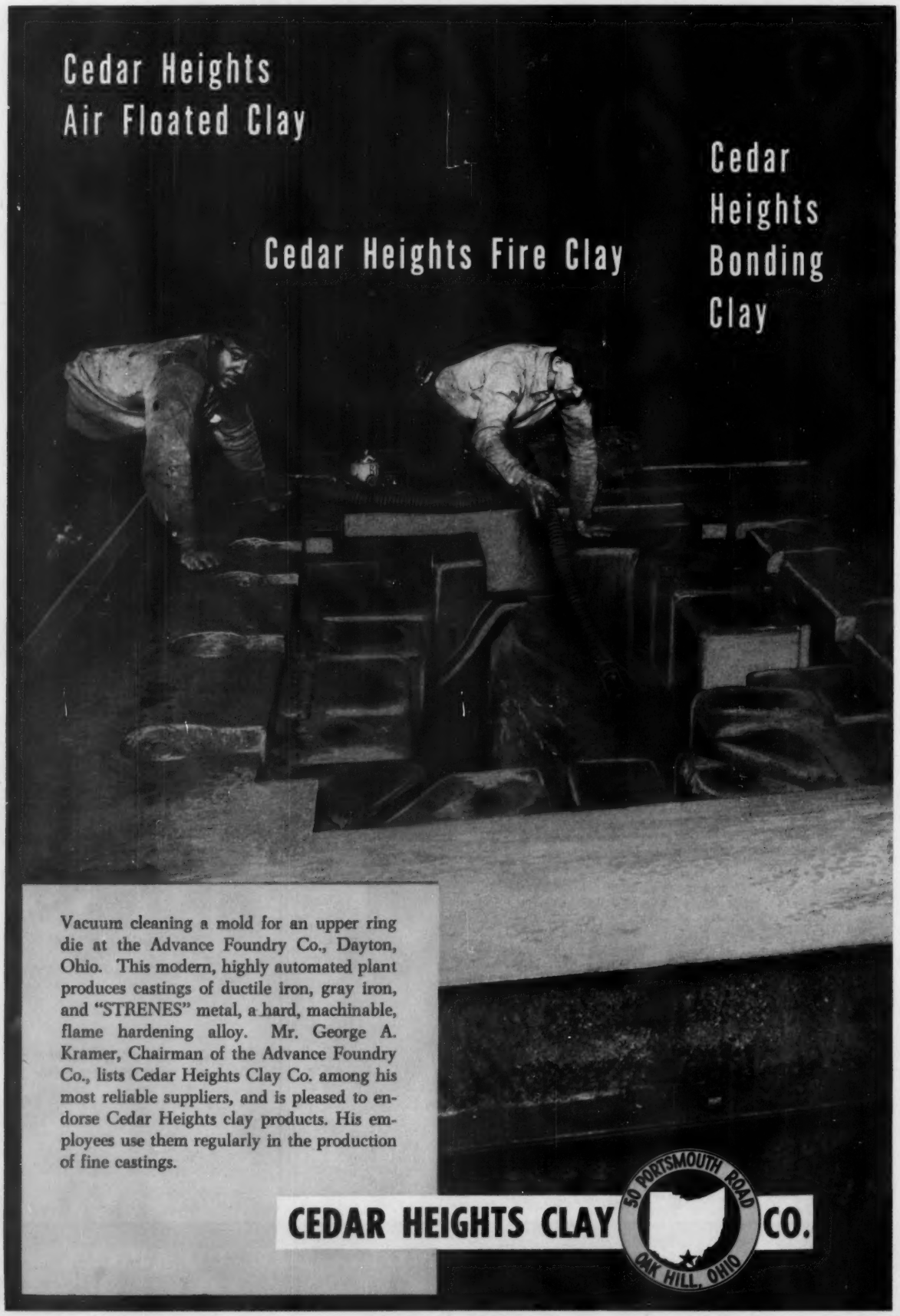
2275 E. Nine Mile Rd. • Warren, Michigan • Phone: SLocum 7-8100

For More Information Circle 611, Page 39

Cedar Heights
Air Floated Clay

Cedar Heights Fire Clay

Cedar
Heights
Bonding
Clay



Vacuum cleaning a mold for an upper ring die at the Advance Foundry Co., Dayton, Ohio. This modern, highly automated plant produces castings of ductile iron, gray iron, and "STRENES" metal, a hard, machinable, flame hardening alloy. Mr. George A. Kramer, Chairman of the Advance Foundry Co., lists Cedar Heights Clay Co. among his most reliable suppliers, and is pleased to endorse Cedar Heights clay products. His employees use them regularly in the production of fine castings.

CEDAR HEIGHTS CLAY CO.

50 PORTSMOUTH ROAD
OAK HILL, OHIO

ity continuous furnaces. First-stage anneal consists of heating to 1720° F, holding approximately 8 hours, slow cooling in the furnace to 1575° F and air blast cooling on a shrouded grid. Total time cycle is 16 to 24 hours. This step converts primary carbide to temper carbon and results in a microstructure consisting of fine pearlite and temper carbon. After a check for hardness, castings are reheated to 1575° F and oil quenched. This operation produces a martensitic-bainitic microstructure prior to a subsequent tempering heat treatment. Final microstructure and mechanical properties are secured by a tempering heat treatment in a three-zone, recirculating air, conveyorized draw furnace. Draw temperature and time can be controlled over a wide range, depending on the specification required. After annealing and heat treatment, the shell castings are abrasive blast cleaned.

Automatic Inspection—Second in importance to the development of the precise annealing process is the development of an inspection tool based on the ultrasonic wave principle. This inspection method quickly, economically, and automatically detects and rejects unsound castings and assures that all shells meet every specification for quality.

The ultrasonic tester has proved an extremely valuable tool in developing various process techniques and in maintaining in-process quality control. It is very low in operating cost and rapid and accurate in its evaluation of internal soundness.

New Steel Foundry Directory Is Published by SFSA

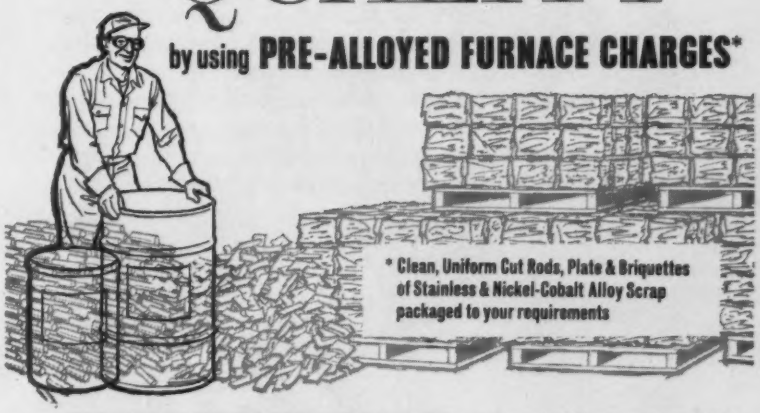
Steel Founders' Society of America has published the 1961-62 edition of its directory of steel foundries in the United States, Canada, and Mexico. The 270-page volume lists all North American steel foundries, their officers and directors, types and sizes of castings produced, processes employed, types of melting and heat treating equipment used, testing facilities, number of employees, and monthly capacities. Names of officers, directors, and committees of SFSA also are included.

The directory is obtainable for $15 from the society, 606 Terminal Tower, Cleveland 13, Ohio.

When melting **STAINLESS STEEL** for casting – you are Guaranteed

highest **QUALITY**

by using **PRE-ALLOYED FURNACE CHARGES***



TODAY'S CASTINGS DEMAND QUALITY—at Security Alloys our new laboratory allows us to offer a written guarantee on the chemical composition of our alloy scrap. All containers color coded for ease in alloy identification and our analysis will meet the most rigid military and commercial specifications.

Whatever your alloy needs are—you will find them at Security where QUALITY is a process, not just a word.

Write for more complete information

FOUNDRY DIVISION

SECURITY ALLOYS CO. INC.

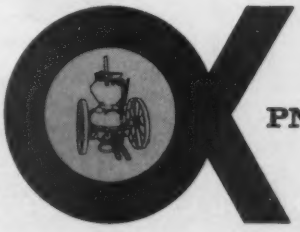
3100 WEST 49th PLACE • CHICAGO 32, ILLINOIS

For More Information Circle 613, Page 39

THE PNEUMATIC GUN . . .

applies adhesive strength of sand-cement layer up to 10" thick in a continuous application!

Force sprays into every crack, crevice and corner for permanent strength in building, repairing or waterproofing concrete construction. Effective for sandblasting, when used without sand-cement mix. Completely dependable, both in operation and results. Has wide application in Steel Industries, Foundries, Refineries, Refractories, all Construction areas.



for details, write to

ALLENTOWN PNEUMATIC GUN COMPANY

1518 WALNUT STREET, ALLENTOWN, PA.

AREA CODE 215, HEmlock 3-4168

Restore Costly Copper Components to Full Efficiency

AT A FRACTION OF REPLACEMENT COST!

ELECTRODE HOLDERS
BUS TUBES
CABLE CLAMPS
TUYERES

Foundry operators can now save thousands of dollars annually . . . dollars normally spent to replace costly copper components. Wilson Welding Company's patented process of restoring badly burned, pitted or scarred copper units to original specifications, or modified to meet your requirements, is guaranteed to perform and give life expectancy equal to that of new components.

The cost? Wilson prices are based upon amount of labor and material involved but rarely equal 50 per cent of replacement cost.

Wilson's prompt service reduces costly down time, since a representative job is completed and shipped within five days after receipt . . . and in less time for emergencies.

Don't discard or scrap salvageable copper components. Restore them to full efficiency at a fraction of replacement cost. Write or call Wilson Welding Company, Inc. for cost estimate or additional information without obligation.

These two views of the same electrode holder show the badly burned and pitted condition in which it was received, and its appearance after restoration to original specifications by Wilson Welding's unique, exclusive process. This holder was shipped within five days after receipt at a cost less than half that of a new unit.

WILSON WELDING COMPANY, INC.
COPPER AND COPPER ALLOY WELDING
Now serving 300 steel mills and foundries throughout the United States and Canada

WW COMPANY INC

P. O. BOX 1634
221 HIGH STREET
ALTIZER ADDITION
HUNTINGTON, W. VA.
JAckson 3-6281

INDUSTRY BRIEFS

Vulcan Iron & Mold Co., Latrobe, Pa., will build a new $7½ million foundry at Trenton, Mich. The foundry will have a capacity of 15,000 ingot molds and stools a month. Construction will begin soon and will be completed late next year.

Ajax Magnethermic Corp., Youngstown, Ohio, has opened a new district office for New York, western Pennsylvania and the Ohio River valley at 2070 Sheridan Dr., Buffalo. The former Erie, Pa., office has been moved to the Oliver Bldg., Pittsburgh.

Crane Co., New York, has purchased substantially all the assets of Deming Co., Salem, Ohio, which includes a gray iron and nonferrous foundry, and will operate it as a division. The acquisition will permit Crane Co. to enter the industrial pump business for the first time in the United States and Mexico.

Cleveland Industries Inc., 887 E. 67th St., Cleveland 3, Ohio, has been formed to manufacture a line of products including replacement wear parts for all commonly used abrasive blast cleaning equipment; complete abrasive blast cleaning systems; and certain specialized industrial processing, heat treating, and material handling equipment related to the abrasive cleaning and foundry fields. These products will be sold and serviced worldwide through the 55 representatives of the Cleveland Metal Abrasive Co., Cleveland. Jack Raleigh is the Cleveland Metal vice president in charge of the sales organization.

Bell International Corp. and **Societe des Forges d'Allevard** are building a new plant at LeCheylas, near Grenoble, France for the production of Wheelabrator steel abrasives and other supply items. The operation of the new plant is being handled by a new company, Societe pour la Fabrication de Grenailles Abrasive Wheelabrator-Allevard, owned jointly by Bell and Allevard.

Willard Bronze Co., Cincinnati, has formed a new subsidiary, Willard Industries Inc., in a new 35,000-sq-ft plant at Graham, N. C. The subsidiary will employ 200 at full operation and will manufacture aluminum precision and permanent mold castings.

Hydraulic Press Mfg. Co., Mt. Gilead, Ohio, has changed its name to H-P-M Div., Koehring Co. Formerly known as the Hydraulic Press Mfg. Co. Div., it was acquired by Koehring in 1956 and manufactures plastic molding, diecasting, and metalworking machines.

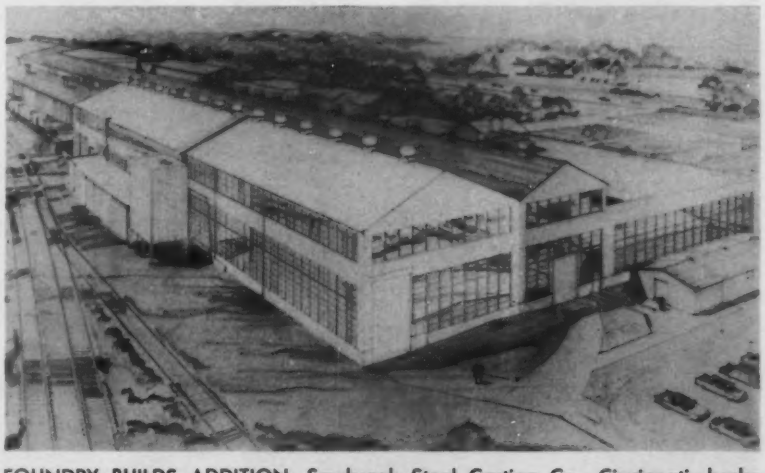
Chevrolet Motor Div., General Motors Corp., Saginaw, Mich., has begun plans on a new building to be devoted to manufacturing development as a part of its gray iron foundry complex. The new facilities will be housed in a separate building of about 28,000 sq ft and will hold a cupola, molding conveyor, coreroom, cleaning room, laboratory, pattern shop, and offices.

Cleveland Crane & Engineering Co., Wickliffe, Ohio, has established a West Coast Tramrail Div. with a plant at 6435 Corvette St., Los Angeles. Karl Pamer is division manager.

Chemical Products Corp., Cartersville, Ga., has started construction of a new plant, adjacent to the existing facilities, for the manufacture of a line of sodium silicates. It will be the first basic sodium silicate operation in the southeast area.

Fulton Industries Inc., Atlanta, has acquired the business and operating assets of Dollin Corp., Irvington, N. J., producer of aluminum and zinc diecastings. The firm will operate as a division of Precision Castings Co., Cleveland, one of Fulton's six operating divisions. Its annual sales volume is about $4 million.

Straight Line Foundry & Machine Corp., Syracuse, N. Y., has been sold to a group of investors whose identity has not been disclosed. Company stockholders voted in May to discontinue operations and liquidate the business. Plans



FOUNDRY BUILDS ADDITION: Sawbrook Steel Casting Co., Cincinnati, broke ground recently for a new, $600,000 addition which will increase plant floor space by nearly 20 per cent. The new section, highlighted in the sketch above, is approximately 60 x 373 ft. New equipment to be installed includes a 10-ton crane and a 2-ton, top charge electric furnace. The new facilities are expected to be fully operational by early spring

←Circle 615, Page 39

Give economy a real workout in your cleaning room

. . . test 44 ALUNDUM B11 wheels against all others*

Test Norton 44 ALUNDUM B11 wheels on your floor stands, swing frames and portables. Compare the results these wheels give you — including wheel costs, work per wheel and time per job — with any other wheel data. Then judge for yourself how these Norton wheels bring improved economy to cleaning room operations.

44 ALUNDUM abrasive is standard priced. But this is no ordinary aluminum oxide. It is made differently — by special Norton electric furnace processing that makes it much denser and tougher. And it performs differently — cutting faster, lasting longer and producing more work than ordinary aluminum oxide abrasive.

The Norton B11 resinoid bond is an equally important improvement for snagging. It assures more uniform wheel structure and better balance, resulting in cooler, faster grinding. And B11 wheels are available in half-grade increments of hardness, making it easier to choose exactly the right wheels for each job.

Your Norton Man, a trained specialist in foundry grinding, will be glad to arrange a test of 44 ALUNDUM B11 wheels in your plant for grinding steel castings — or of regular ALUNDUM B11 wheels for grinding annealed malleable iron castings. See your Norton Distributor, or write to NORTON COMPANY, General Offices, Worcester 6, Massachusetts.

*Trade Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON
ABRASIVES

W-2013

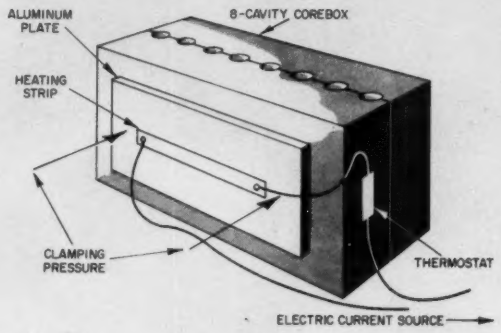
Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Non-Slip Floors — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

HOW TO DO IT

Electric Heating Strip Converts Standard Corebox to Hot Box Use

By VIRGIL F. THOMPSON
Canton, Ohio



CONVERSION of conventional metal coreboxes to hot box operation is a comparatively simple job. We did it in our shop by using two aluminum plates measuring 4 x 8 x ½ in. A 300-w heating strip was attached to each plate and wired in series with a thermostat having a range of 600° F. The plates were fastened to the clamping arms of a bench coreblowing machine.

A corebox is clamped between the plates and preheated until the temperature reaches that desired for operation. We used a sand mixture containing liquid resin, wax, hexamethylenetetramine, and a little water. Half-inch-diameter pin cores, 3 in. long were produced in an eight-cavity box on a 20-second cycle.

Have any ideas of your own? FOUNDRY will pay a minimum of $15 for each "How To Do It" item submitted and published

of the new owners for the property have not been revealed.

Electrode Div., Great Lakes Carbon Corp., New York, has shipped an 18-ton graphite block to American Shipbuilding Co. Said to be one of the two largest pieces ever produced, the block measures 2 ft x 6 ft x 27 ft 9 in. It will be used with its twin as a permanent mold for casting steel slabs by the pressure pouring process.

International Minerals & Chemical Corp., Skokie, Ill., has acquired Aristo Corp., Detroit manufacturer of foundry binders, through an exchange of IMC common stock for all Aristo stock. George Abbott will continue as president of Aristo, which will be operated as an IMC subsidiary.

Master Electric Co., Dayton, Ohio, has closed its Dayton operations after 41 years and is opening new plants at Columbus and Madison, Ind. The foundry will operate until June, 1962.

Bonney-Floyd Co., Columbus, Ohio, has been licensed by U. S. Steel Corp., Pittsburgh, to produce and sell quenched and tempered castings of a "T-1" constructional alloy steel. It is the only Ohio foundry and one of only three in the nation licensed to produce them.

Hensel & Associates, Cincinnati, have been appointed general sales agent for the material handling equipment division of Gifford-Wood Co., Hudson, N. Y. General sales offices, under the management of James A. Gailey, are at 313 Mariemont Bldg., Cincinnati.

Florence Pipe Foundry & Machine, Florence, N. J., has consolidated with its sales subsidiary, R. D. Wood Co., Philadelphia. The Florence Pipe name will be discontinued, and the corporate name will be R. D. Wood Co.

Riehle Testing Machines Div., American Machine & Metals Inc., East Moline, Ill., has purchased Steel City Testing Machines Inc., Detroit, and the hardness tester business of Torsion Balance Co., Clifton, N. J.

Northwestern Metal Co., Lincoln, Neb., has started construction of a 67,000-sq-ft automated nonferrous smelter and scrap handling facility in Lincoln's North Side industrial park. It will produce secondary aluminum, brass, and white metal for foundry markets. The present smelter at 900 T St., Lincoln, is to be closed after 53 years of continuous operation.

Casting Equipment Inc., Berea, Ohio, has been appointed representative for the central region of northern Ohio and western Pennsylvania for Newaygo Engineering Co., Newaygo, Mich. Casting Equipment was organized early this year by J. D. Robbins and A. J. Filipic.

Avnet Electronics Corp., New York, and Foundry Equipment Ltd. of England have formed Feco Inc. to advance automation of the Shaw Process. Avnet holds exclusive western hemisphere rights to the process, and Feco will sell the British firm's automated equipment in this country.

Sunbeam Equipment Corp., Meadville, Pa., has acquired Mern Industries, Oconomowoc, Wis., manufacturer of heat treating furnaces and equipment. Purchase included all engineering, patent rights, and plant equipment.

Circle 617, Page 39→

CHIP MELTING–

Another economical application for induction melting.

WATCH AM

98% or more of the charge is converted to molten metal in AM Induction Melting furnaces. This high recovery rate, together with negligible alloy losses and simple temperature control, produces quality metal at a low cost from chips, borings, turnings and other scrap material.

Induction Heating is our ONLY Business

AJAX Magnethermic CORPORATION

GENERAL OFFICES P.O. Box 839 • Youngstown 1, Ohio
TRENTON DIVISION 930 Lower Ferry Road • Trenton 5, New Jersey
YOUNGSTOWN DIVISION 3990 Simon Road • Youngstown 12, Ohio
AJAX MAGNETHERMIC CANADA LTD. Box 779 • Ajax, Ontario

The newest combination in Induction Melting equipment — Steel Cage Coreless Furnace powered by a 300 KW Multiductor.

Defects seen in this macrograph of a malleable iron casting are pinhole cavities

MORE DISCUSSION OF . . .

Pinhole Porosity in Gray Iron

By J. V. DAWSON
British Cast Iron Research Association
Alvechurch, Birmingham, England

Editor's Note: The following commentary refers to the article "What Causes Pinhole Porosity in Gray Iron?" which was written by Ernest Haack, Muskegon Piston Ring Co., Sparta, Mich., and presented in the June issue.

● THE ARTICLE "What Causes Pinhole Porosity in Gray Iron?" is a serious attempt to justify experimentally the opinion that pinholing may not always be due to hydrogen pickup from the mold promoted by aluminum in the iron—but that it can be due to a carbon/oxygen reaction.

Mr. Haack has obviously made a serious study of the literature, and I agree that shotlike beads of metal do frequently occur in pinholes. This is especially true with irons near to eutectic composition and particularly with those containing phosphorus. In my experience, however, these particles are usually of eutectic composition and frequently have a high concentration of phosphorus. I always have held the view that they are exudations of eutectic which occur during the later stages of solidification when it is easier to "purge" into the open space of a pinhole rather than through the solid casting skin.

These beads normally have a characteristic eutectic structure and, in irons containing phosphorus, the concentration of phosphorus in the beads gives a structure which easily might be confused with that resulting from rapid cooling. It is disappointing that Mr. Haack's paper does not contain a microphotograph to substantiate his comment that the beads have cooled at a much faster rate than the surrounding material.

It is notable that such small beads of "purge" metal are visible in the left hand section of Fig. 3 showing a blowhole defect caused by the addition of a bead of oxidized steel shot.

As with Chills — The interesting fact that oxidized steel shot gave blowholes whereas cleaned shot did not is probably analogous to the blowing which occurs if inadequately cleaned or oxidized chills are used in a mold. Mr. Haack makes no comment with regard to the condition of the surface of the blowholes caused by these particles of oxidized steel shot, but I believe that the defects would be covered with a layer different from that ascribed to pinholes caused by hydrogen pickup.

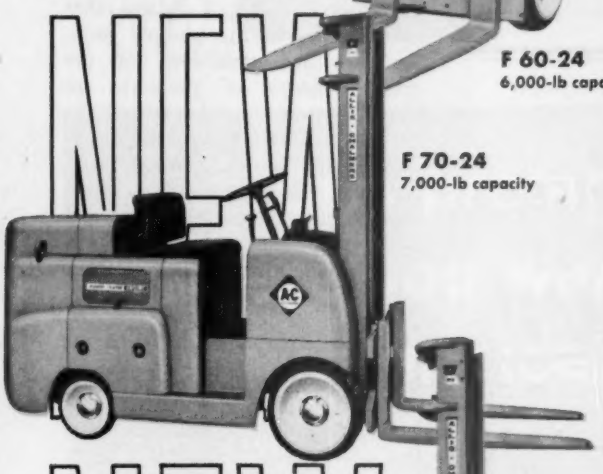
I agree that CO/CO_2 atmospheres can deposit carbon under appropriate conditions, and indeed, my colleagues and I have observed many such depositions formed during work carried out in this type of atmosphere. However, these have always been of an amorphous, sooty nature, and we have never found crystalline graphite in such deposits. On the other hand, we frequently have found graphite crystals growing on the surface of irons solidified or heat-treated in dry hydrogen, argon, or high vacuum atmospheres, this graphite obviously originating from the iron.

Effect of Aluminum—The illustrations of the effect of aluminum on kish deposition are very clear, and I hold a similar view on the effect of small quantities of aluminum. However, it is difficult to visualize how the effects shown in Mr. Haack's Fig. 4 and 5 could occur in a small mold filled with liquid iron, and this would be particularly true of a small piston ring mold. In any case, such a mechanism is only applicable to hypereutectic iron capable of depositing kish graphite, whereas we know that aluminum causes pinholes containing graphite films in irons of hypoeutectic composition and even in irons cast in sections so thin that the majority of the casting is white.

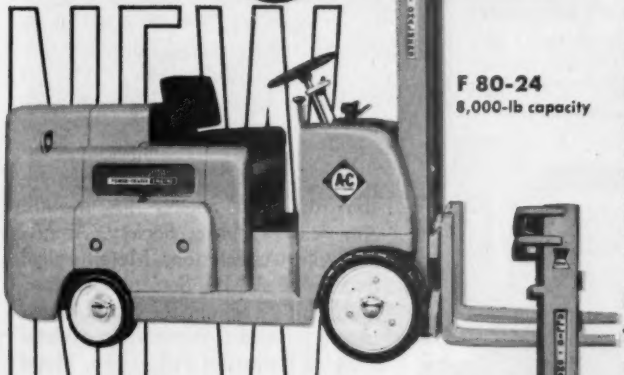
In the discussion Mr. Haack states that some other investigators have revealed shotlike particles but that, in general, they have ignored them. In particular he states that a macrograph in a paper published by me shows at least four particles of shot with no comment on their presence. This is not so since I stated quite clearly in the text that this figure showed pinholes in a malleable iron casting. Inadvertently, the particular photograph was printed upside down, and the resulting effect of the lighting could

NEW Allis-Chalmers Lift Trucks Give You *more for your money!*

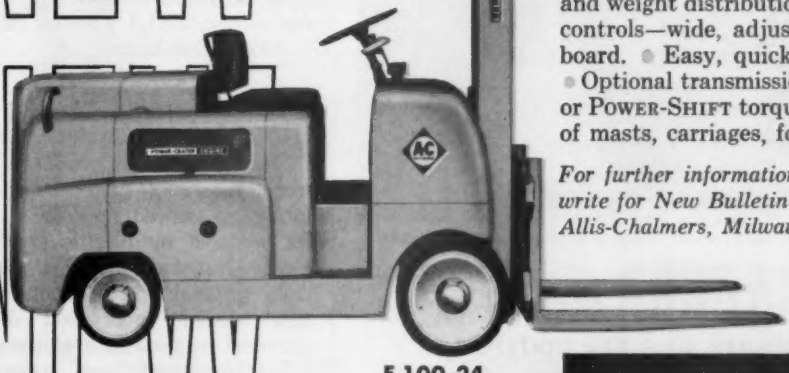
F 60-24
6,000-lb capacity



F 70-24
7,000-lb capacity



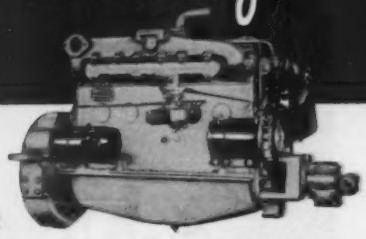
F 80-24
8,000-lb capacity



F 100-24
10,000-lb capacity

Special-Purpose trucks with high underclearance, FS60 —6,000-lb, FS70 — 7,000-lb, FS80 — 8,000-lb capacity.

For More Information Circle 618, Page 39



POWER-CRATER engine 6 cylinders

NEW POWER

Allis-Chalmers' OWN — POWER-CRATER engine is engineered specifically for Allis-Chalmers lift trucks. Has unique crater-shaped combustion chamber that sets up violent swirling turbulence for thorough mixture of air and fuel, resulting in responsive power and maximum fuel economy.

NEW MASTS AND FORKS

Sturdy steel channels move easily over bearing-mounted load rollers. New piston-type cylinder with patented, self-adjusting packing minimizes maintenance. New forks have rounded ends and long taper for easy entry under loads. Forks are easily spaced with new spring-loaded latch.

Have Your Allis-Chalmers Dealer Show You the Many Advantages of "F" Series Lift Trucks

Unusual grade-climbing ability due to power, balance and weight distribution. Familiar, automotive-type controls—wide, adjustable seat—unobstructed floor board. Easy, quick, maintenance accessibility. Optional transmissions—constant-mesh, two-speed or POWER-SHIFT torque converter drive. Versatility of masts, carriages, forks and attachments.

For further information, write for New Bulletin BU-680. Allis-Chalmers, Milwaukee 1, Wisconsin.

BH-177

POWER-CRATER is an Allis-Chalmers trademark.

ALLIS-CHALMERS

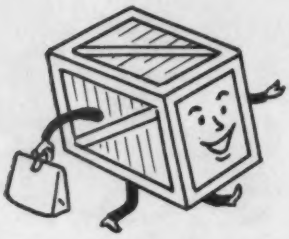
Compare and You'll Choose Allis-Chalmers

suggest that the pinhole cavities were beads and I am therefore including a copy of this photograph correctly mounted. I would like to reaffirm that the defects shown in this macrograph are in fact pinhole cavities.

In conclusion, I feel that, while Mr. Haack has described an interesting method of producing blowhole defects, it is unlikely that many industrial outbreaks of pinholing can be ascribed to this cause. Over recent years, my colleagues and I have investigated many pinholing problems in the United Kingdom, and, without exception, the cause of the outbreak has been a trace of aluminum in the iron causing excessive pickup of hydrogen from the mold. A small number of pinholed castings from the United States has also been examined and the nature of the defects suggests that they are due to the same cause.

Scrap Major Source—The aluminum usually originates from one of two sources, the major one of these being the use of contaminated scrap castings. The worst offender in this class of material is the use of complete automobile engines which contain light-alloy pistons and other parts. These give sufficient aluminum in the metal to give severe outbreaks of pinhole defects. The other common source of aluminum is the excessive use of ferrosilicon type inoculants which normally contain, of necessity, a small per centage of aluminum.

In spite of Mr. Haack's interesting experiments, I believe that investigation of the pinhole problem now has established that the great majority of pinholes are caused by mold/metal reaction promoted by aluminum resulting in hydrogen entering the metal and forming small subsurface bubbles which always have oxide-free surface and which are bright and frequently contain graphite films on their surfaces.



IMAGINE OUR SURPRISE!

. . . we shipped

A SALESMAN

to MARION MALLEABLE!

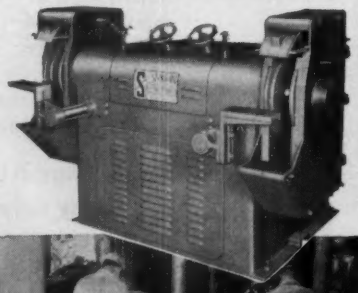
Yes sir, that FIRST Standard 35C Infinitely Variable Speed Grinder we shipped to Marion Malleable in Marion, Indiana SOLD 4 MORE IN LESS THAN A YEAR! When we asked grinding room Super Harold Williams about it, his answer was short — and mighty sweet: "WITH YOUR GRINDERS, WHEEL COST IS DOWN AND PRODUCTION'S UP!"

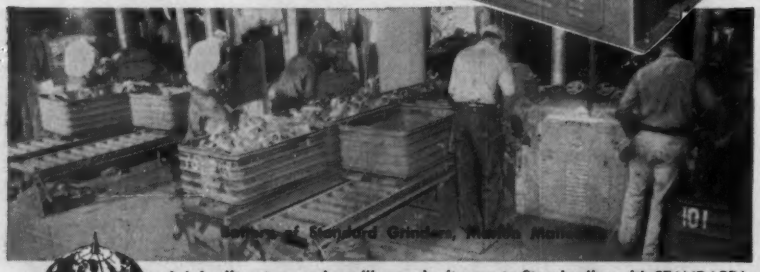
Here's the way it looks all dolled up in chart form:

Make of Grinder	Wheel Cost Per Ton	Avg. Hourly Production-Tons
Brand X	$3.20	.44
Standard No. 35C	**$1.75**	.49

IT'S THE STANDARD STORY WHEREVER YOU GO. Like we said "mighty sweet" ...FOR RAISING YOUR PROFIT CURVE.

SUPER SALESMAN!
The Standard No. 35C
Infinitely Variable Speed
SNAGGING GRINDER





Ask for literature and you'll see why it pays to Standardize with STANDARD!

HALLMARK OF METALWORKING THROUGHOUT THE WORLD

Since 1912

the STANDARD electrical tool co.

FOUNDRY GRINDER DIVISION

2507 RIVER ROAD • CINCINNATI 4, • OHIO

Technical Groups Will Offer 62 Sessions at Metal Show

Ten American technical societies and associations, including a combined membership of more than 100,000, will present 62 half-day technical sessions at the Detroit Metal Show sponsored by American Society for Metals, October 23-27 at Cobo Hall, Detroit.

Taking part in the program are the American Society for Metals, American Welding Society, American Gas Association, Metallurgical Society of AIME, Society for Nondestructive Testing, Industrial Heating Equipment Association, Metal Powder Industries Federation, Metal Treating Institute, Special Libraries Association, and Ultrasonic Manufacturers Association.

Crane Specifications Issued

Specifications for electric overhead traveling cranes and basic crane information are contained in a booklet prepared by Electric Overhead Crane Institute Inc. Six sections cover general specifications, structural design, mechanical design, electrical equipment, a glossary defining commonly used crane terminology, and appendixes with service classifications. Distribution is through EOCI members.

The largest modern dry ice car made today—50 ton capacity.

CO_2 promptly delivered where you want it... as dry ice...liquid...or gas

ThermIce has established distribution centers in ten strategic areas, listed below. Modern 80 ton liquid CO_2 depot storage tanks assure constant supply. All these distribution depots are now in full operation, completely staffed and equipped. • Fifteen ton bulk liquid trailers and insulated dry-ice vans speed delivery to you. For something special in CO_2 service—call ThermIce today!

Biggest and finest liquid CO_2 car in the industry. 70 ton capacity.

Subsidiary of **PUBLICKER INDUSTRIES INC.**

1429 Walnut Street, Philadelphia 2, Pa.

Philadelphia—DEwey 4-7255
New York—COrtlandt 7-8533
Jersey City—SWarthmore 8-2233
Boston—ANdrew 8-5250

Washington, D.C.—ENterprise 1-3553
Baltimore—PEabody 2-3550
Chicago—KEnwood 6-2244

St. Louis—PRospect 6-0860
Cincinnati—621-9605
Cleveland—VUlcan 3-4166
Detroit—VInewood 2-8868

Knight LETTER

EIGHTH IN A SERIES

To: Foundry Management

Subject: Today's Technological and Competitive Problems

In all my 33 years of association with the foundry industry, I've never seen so many technological and metallurgical developments—nor a harder battle for determination of what metal or what method should be used to produce the casting most economically and satisfactorily.

We suggest that you have us make an audit of your operations and marketing methods to assist you to evaluate your present situation and plan for the future.

Are you satisfied with present productivity, present operating costs, present profits? Are you prepared or preparing to produce thin section, close tolerance castings of various compositions—competitively and profitably?

With our experience here and abroad, we believe we are in an unique position to be helpful. If you are interested, we will be glad to discuss it, without obligation.

Lester B. Knight

KNIGHT SERVICES INCLUDE:

Foundry Engineering • Construction Management • Modernization • Mechanization • Automation • Survey of Facilities • Materials Handling • Methods • Industrial Engineering • Wage Incentives • Cost Control • Standard Costs • Flexible Budgeting • Production Control • Organization • Marketing

Lester B. Knight & Associates, Inc.

Management Consultants, Industrial and Plant Engineers

Member of the Association of Consulting Management Engineers, Inc.

549 W. Randolph Street, Chicago 6, Illinois

New York Office—Lester B. Knight & Associates, Inc., Management Consultants, 500 Fifth Ave., New York 36
20111 James Couzens Highway, Detroit 35, Michigan
Knight Engineering A.G. (Zug), Zurich Branch, Dreikönigstrasse 21, Zurich, Switzerland
Lester B. Knight & Associates, G.M.B.H., Berliner Allee 47, Düsseldorf, Germany

SPECIFICATIONS DISREGARDED...

By Many Gray Iron Foundries

Consumers make extensive use of standard specifications, but survey indicates castings producers are careless in determining that their product meets these specifications

By H. W. LOWNIE JR.
Division Chief
Battelle Memorial Institute
Columbus, Ohio

and

C. F. WALTON
Technical Director
Gray Iron Founders' Society
Cleveland

● WRITTEN SPECIFICATIONS are the basis on which many products and materials are bought and sold. The American Society for Testing Materials is the major specification-writing body in the United States.

ASTM committeemen representing foundries, purchasers of castings, and general interests spend many hours each year writing specifications. They have several goals: 1. To set up workable specifications. 2. To give the customer assurance that he is getting the material he designed for. 3. To guide customers on what materials foundries can produce. 4. To upgrade the quality of iron castings.

How widely are the resulting specifications used by customers in describing the iron they want? How well do foundries meet these specifications?

Conducts Survey — Partial answers to these questions were the goal of a survey made in March and April of 1961 by ASTM Committee A-3 on Iron Castings. This is a report of some of the results—results that are discouraging to persons interested in upgrading the image and quality of gray iron.

The answers are simple. Many customers use standard specifications, such as ASTM, to describe the product they expect to get. On the other side of the fence, gray iron foundries in general do a slipshod job of determining that their product meets the specification.

The study was based on a special questionnaire prepared by Subcommittee 6 and sent by the co-operating Gray Iron Founders' Society to a mailing list of about 2200 gray iron foundries in the U. S. and Canada.

Seven questions were asked. Some were directed at resolving specific situations and will not be discussed further here. Other questions were directed at better definition of the over-all situation on specifications procedures in gray iron foundries. Answers to these are analyzed below.

A total of 454 foundries returned questionnaires. This was about a 20 per cent return. The returns constituted an excellent sample. As the answers were received, they were tabulated and analyzed in groups of 100. The results of analyses on each block of 100 returns were about the same as the results for the entire sample.

There were 383 useful reports of tonnage. The distribution of returns was as follows:

Melt size	1 to 12,000 tons per month
Average melt	410 tpm
Median melt	150 to 200 tpm
Melt distribution	55% of foundries melt 200 tpm or less. 35% of foundries melt 201 to 800 tpm. 10% of foundries melt over 800 tpm

Based on general statistics for the gray iron industry, this appears to be a representative sample.

Customer Specifications—Foundries were asked to indicate which of ten types of specifications are called for by their customers. The results are presented in Table I.

They indicate the wide use of ASTM specifications by castings buyers. Based on the useful returns, 88 per cent of the foundries are asked to meet ASTM specifications on at least some castings.

About 60 per cent of the foundries are called upon to meet nonstandard specifications imposed by some of their customers. Only about 12 per cent of the foundries do not have to meet some type of specification established by an outside agency.

Use of ASTM Specs—Foundries were asked to indicate the percentage of their production that is made to some ASTM specification.

Half of the responding foundries make 20 per cent or less of their iron to ASTM specifications, and half make more than 20 per cent to ASTM specifications. Of the total tonnage reported, a surprisingly high average of 31.3 per cent is ordered to ASTM specifications. For the industry, this amounts to an average of 1 million to 2 million tons a year—an amount at least equal to the total annual sales of all types of steel castings.

TABLE I—Types of Specifications Requested by Customers

	No. of Foundries Asked To Meet These Specs.
American Society for Testing Materials	334
Customer's private specification	237
Society of Automotive Engineers	131
U. S. Military and Navy	94
Federal	88
American Waterworks Association	31
American Standards Association	21
American Society of Mechanical Engineers	17
American Association of State Highway Officials	5
Canadian Standards Association	3
Other	13
No specifications called for	47

Foundries were asked which of six major ASTM specifications they

TABLE II—Six Major ASTM Specifications Requested by Customers

ASTM Specification	Number of Foundries: Called for Regularly	Called for Occasionally	Called for Sometimes*	Never Required	Total Useful Returns
A 48—"Gray Iron Castings"	183	129	312	50	362
A 159—"Automotive Gray Iron Castings"	51	73	124	117	241
A 278—"Gray Iron Castings for Pressure-Containing Parts"	18	50	68	147	215
A 319—"Gray Iron Castings for Elevated Temperature for Non-Pressure Containing Parts"	10	44	54	152	206
A 190—"Lightweight and Thin-Sectioned Gray Iron Castings"	12	19	31	178	209
A 438—"Transverse Testing of Gray Cast Iron"	2	10	12	172	184

*Total of two preceding columns.

are called upon to supply. No attempt was made to determine the frequency of use of specifications not included in the six listed. The results are tabulated in Table II.

The results show the predominant position of A 48 in the specification structure.

It is informative to see that of 381 useful ballots, 362 foundries recognized the A 48 designation sufficiently to comment on it. The other ASTM specifications were recognized by a much smaller percentage of the foundries. For example, for A 190, "Lightweight and Thin-Sectioned Gray Iron Castings," only 209 foundries recognized the identification well enough to comment on their use or nonuse of it.

Mechanical Tests — Foundries were asked the nature of the tests for specification A 48 they make to be sure their iron meets an ASTM Class 30 designation. Five choices of tests were given: Tensile, transverse, chemical, chill, and hardness.

Compliance with A 48 requires that a tensile test be made unless a transverse test is approved in writing by manufacturer and purchaser. According to the specification, a mechanical test (tensile or transverse) is mandatory.

On the matter of mechanical tests, the results were as follows:

	No. of Foundries	% of Foundries
Tensile test only	134	34
Transverse test only	23	6
Tensile and transverse	99	25
No mechanical test	142	35
		100

From this, at least 35 to 41 per cent of the responding foundries admit to failure to make the specified mechanical tests.

Of the 59 to 65 per cent that claim to make the specified tests, there remains the question whether the tests are made under the specified conditions and with the specified frequency.

The results on tests in the optional category (made solely for in-foundry control) were as follows:

	No. of Foundries	% of Reporting Foundries
Chemical	221	53
Chill	172	44
Hardness	177	44

Most surprising in this analysis was the fact that 105 foundries (26 per cent of the total) said they make none of the five listed tests. In contrast to this, 49 foundries (12 per cent of the total) said they make all five tests.

Types of Test Bars — Another question in the survey when paraphrased asked "What type of test bar do you cast and test when you do use one?" The question dealt with a casting with a wall ¼ in. thick. The correct answer, according to the specification, was "ASTM A 48 Type A test bar cast in dry sand or a core." The results are shown in Table III.

Although Specification A 48-60T calls for the foundry to cast test bars in dry sand molds (or cores), 42 per cent of the reporting foundries use green sand.

Specification A 48-60T recommends a short Type A bar cast in dry sand. Using this strict interpretation of the specification, only 2 per cent of the reporting foundries comply.

Using a very liberal interpretation of the specification, and assuming that the necessary agreement was obtained with customers, one can say that any Type A or Type B bar cast in dry sand would meet the requirements. Even on this liberal basis, only half of the reporting foundries comply with the specification.

Finally, 15 per cent of the reporting foundries that make mechanical tests do so on test bars that are not described in the specification.

Customers' Exceptions — One question in the study endeavored to determine how much of a problem exists because of special requests by customers.

About 49 per cent of the foundries reported that they have no requests for exceptions to standard specifications. This result in itself suggests that the deviations in test bar practices as reported in the previous paragraphs are the foundry's doing, not the customers'.

About 34 per cent of the foundries do have requests for specials and exceptions but believe that these requests cause them no special problem.

Finally, 17 per cent (68) of the foundries said that they have troublesome special requests. These troubles were concentrated mostly in the larger foundries. This group had an average melt of 820 tons per month as compared with an average of 410 tons for all foundries in the sample.

Special problems and exceptions receiving the most frequent mention as trouble spots were as follows:

1. Requirements dealing with microstructure.

TABLE III—Types of Test Bars Used by Foundries

Type of Test Bar	No. of Foundries—Type of Mold—Green Sand	Dry Sand	Total	% of Foundries
Type A—short	3	5	8	3
Type A—medium	21	27	48	16
Type A—long	41	51	92	30
Type B—short	6	8	14	5
Type B—medium	17	28	45	15
Type B—long	18	30	48	16
Nonstandard	20	27	47	15
Total useful returns	126	176	302	...
Per cent of useful returns	42	58	...	100

For More Information Circle 622, Page 39

CORE OIL SELECTION CHART*

CORE BAKING PROBLEM		CORE OILS RECOMMENDED – listed in order of preference							
SECTION SIZE CORE (inches)	CURING CONDITIONS** AND BAKING TIME (420–450°F BAKING TEMP.)	BLACK OILS				AMBER OILS***			SPECIALTY OILS
		1	2	3	4	1	2	3	
1 and under	FAST (less than 30 min.)	750	731	730	720	Sup. L.	RO503	Cont.	Lin-O-Plast Impeller cores D-Process #4 Impeller cores where lower green strength needed
	MEDIUM (30-45 min.)	731	730	720	710	RO503	Cont.	#3	
	SLOW (Over 45 min.)	730	720	710	---	Cont.	#3	Li. Ro.	
1 to 3	FAST (30-45 min.)	I #6	I B-2	I C-2	I C-3	I #1	I #4	---	Archer #1 Boiler section cores (complex) and radiator cores 720 – Boiler section cores (regular)
	MEDIUM (45-60 min.)	I B-2	I C-2	I C-3	750	Sup. L.	RO503	Cont.	
	SLOW (Over 60 min.)	731	730	720	710	RO503	Cont.	#3	
3 to 6	FAST (45-90 min.)	I #6	I B-2	I C-2	I C-3	I #1	I #4	---	
	MEDIUM (90-120 min.)	I B-2	I C-2	I C-3	750	Sup. L.	RO503	Cont.	
	SLOW (Over 120 min.)	750	731	730	720	RO503	Cont.	#3	
6 and over	FAST (90-150 min.)	I #6	I B-2	I C-2	I C-3	I #1	I #4	---	704 – For poor quality sands high in clay content and poor grain distribution
	MEDIUM (150-300 min.)	750	731	730	710	RO503	Cont.	#3	
	SLOW (Over 300 min.)	730	720	710	---	Cont.	#3	Li. Ro.	

*Core Oils are recommended in broad generalizations. Specific core problems within a shop may require deviations from the recommended oil to meet specific needs.

**Oven Conditions Assumed
1. Temperature is controlled and even
2. Load is optimum or under
3. Air supply is plentiful

***Amber core oils are not in all cases equivalent in strength or speed to the black oil recommended for the same general condition. This is particularly true of Inductol #1 and #4 which are the fastest baking oils available. The main criterion upon which oils were selected was baking speed

Legend:
All oils are Linoil Series unless otherwise identified as follows:
I – Inductol
Sup. L. – Super Linoil
Cont. – Continental
Li. Ro. – Liquid Rosin

Archer-Daniels-Midland company
FEDERAL FOUNDRY SUPPLY DIVISION · 2191 West 110th Street · Cleveland 2, Ohio

Handling castings in Wirebounds cuts 7-10 hours per truck load

Foundries using Wirebound pallet boxes save 7 to 10 man hours per truck or carload over handling and shipping castings in conventional bags . . . man hours which add up to 30% savings in shipping labor for some foundries.

Besides eliminating the cost of filling and tying bags, Wirebound's large capacity and ease of handling contribute to better utilization of warehouse and loading space; simplify your order checking and inventory control.

Low cost expendable Wirebounds pay for themselves by eliminating the high cost of keeping track of returnable containers and the cost of return shipping.

Rugged Wirebound pallet boxes stack safely three and four high. They retain their natural strength even when stored outside, exposed to all types of weather.

Your customers realize savings, too, when you ship in Wirebounds. Their handling is minimized—no bags to open, no containers to return. Castings are accessible and easily identifiable at all times.

• To learn how Wirebound pallet boxes can help you realize savings, contact Wirebound box manufacturers or write to the address below.

WIREBOUND BOX
MANUFACTURERS ASSOCIATION INC.
222 W. Adams Street, Room 1468
Chicago 6, Illinois

1236

2. Requirements for narrow hardness tolerances on castings.
3. Requirements for unrealistic ratios of hardness in castings to strength in test bars.
4. Requests for notarization of test bar results.
5. Orders for tradenamed irons with no description of the iron.
6. Lack of customer understanding of the effect of section size.
7. Special alloying.

Although the statistical information about the average foundry's compliance with specifications is enlightening, equally enlightening are the comments offered in writing by some foundries during the study.

A number of the comments indicated that many foundries lack familiarity with ASTM specifications, are unwilling to comply with specifications, and, in some cases, lack knowledge of the capabilities of gray iron.

Summary — The facts resulting from the survey of representative groups of gray iron foundries show that, on the average, foundry compliance with specifications is poor. In some cases compliance is lacking entirely. Shining through this rather unpretentious average, however, is the fact that a certain percentage of foundries comply with the specifications they are given.

Magnesium Association To Meet In New York, Oct. 16-18

The Magnesium Association will hold its 17th annual convention at the Belmont Plaza Hotel, New York, on Oct. 16-18. Theme of the meeting will be "Magnesium in Focus" with the program devoted to papers discussing applications and technical developments which have focused attention on magnesium during the past year.

Another feature will be an exhibit of little known commercial applications of magnesium. One session of the convention will be devoted to a panel discussion of standards and specifications from the points of view of the customer and supplier.

Program details can be obtained or arrangements can be made to display any magnesium products without charge by writing to the association at 122 E. 42nd St., New York 17, N. Y.

POSITIVE DUPLICATION—EVERY TIME!

One animal makes tracks like these, a pattern that is positively duplicated only by the grizzly bear. And only Cincinnati offers you the Positive Duplication of these SWING FRAME WHEELS, and of *all* CINCINNATI (PD) °SNAGGING WHEELS.

HOW WE ACHIEVE "PD"

To produce wheels of unsurpassed uniformity, Cincinnati developed a unique manufacturing process. It involves 36 separate quality controls, from formula blend to final inspection. For example, cams for temperature control of drying ovens must pass regular tests for accuracy, and checking procedures never vary.

HOW UNIFORMITY HELPS YOU

One big advantage of CINCINNATI (PD) WHEELS is—longer wheel life. Using (PD) WHEELS you get costs down and *keep* them down, because each reorder wheel will act and grind exactly like the original. This is the promise—and *performance*—of Positive Duplication.

CUT COSTS . . . CALL CINCINNATI

Our factory representatives are trained specialists, experienced in snagging and grinding operations. Their skills are at your service. Just call your CINCINNATI (PD) GRINDING WHEEL Distributor, or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

(PD) POSITIVE DUPLICATION

CINCINNATI
GRINDING WHEELS

°Trade Mark Reg. U.S. Pat. Off.

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

For More Information Circle 624, Page 39

FOUNDRY DEVELOPMENTS

By EDWIN BREMER
Metallurgical Editor

Desulfurization

PROCEDURE for desulfurizing cast iron has been developed by the British Cast Iron Research Association, and is described in the March issue of *BCIRA Journal* in "An Improved Method for Desulphurizing Cast Iron with Sodium Carbonate" by R. B. Coates and R. Williams.

It is reported that by using basic-lined ladles and metal temperatures of 2552° F, before mixing, a 1 per cent addition of sodium carbonate will enable an initial sulfur content of 0.15 per cent to be reduced to below 0.01 per cent.

Briefly the method is to tap the iron into the ladle containing the sodium carbonate, preferably in granular form, and then agitate the molten bath by injection of compressed air through a lance nearly touching the bottom of the ladle.

Measuring Creep

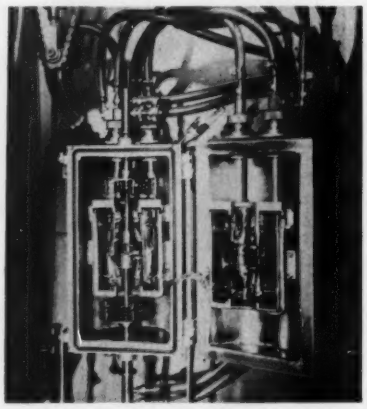
ADDITIONAL results obtained in a continuing program to provide accurate measurements of mechanical and physical properties of some copperbase casting alloys now are available. They were presented in a paper, "Creep and Rupture Properties of Five Copper-base Casting Alloys," by D. P. Moon and W. F. Simmons, Battelle Memorial Institute, at the recent ASTM meeting.

The authors found that the 76 Cu, 2½ Sn, 6½ Pb, 15 Zn alloy has high creep strength relative to its short-time tensile strength up to about 520° F, and its stability is good. The 65,000 psi manganese bronze is limited by its loss of creep strength above 290° F. Prolonged application of 110,000 psi manganese bronze is limited above 350° F because of the sharp decline in creep strength and poor stability above that temperature.

For the same reason, long-time use of 81 Cu, 4 Si, 15 Zn silicon brass should be restricted to 450° F or lower. Creep in the 20 per cent nickel silver is insignificant up to 550° F; melting of a lead phase in the alloy prohibits application at higher temperatures.

Simulates Outer Space

RECENTLY two vacuum tensile test furnaces were installed by Crucible Steel Co. of America at its Central Research Laboratory, Pittsburgh. Equipment is used for determining the strength of refractory metals under conditions simulating conditions hundred of miles above



the earth. The vacuum furnaces were developed by High Vacuum Equipment Corp., Hingham, Mass., and permit testing at temperatures up to 3500° F under vacuum of 0.0001 to 0.00001 mm of mercury.

Considers Stress Data

VARIOUS properties derived from and associated with the standard stress-strain curve are evaluated and related to the behavior of alloys under stress in a report "Practical Evaluation of the Standard Stress-Strain Curves and Related Properties" by R. H. Harrington. It points out that several other properties directly related to the stress-strain curve are preferable to the 0.10 or 0.20 per cent offset yield strengths for present applications and future developments. It is the ability of an alloy to deform elastically with measurable plastic deformation that determines its most efficient and safe use in the majority of applications. The report is designated PB 161,896 and may be obtained from the Office of Technical Services, U. S. Department of Commerce, Washington 25, for 75 cents.

Develops Strain Gage

RECENT publication issued by the National Bureau of Standards is Monograph 26. It is entitled "Development of High-temperature Strain Gages" and may be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, for 20 cents.

The monograph summarizes work done at the bureau in a research program which resulted in development of high-temperature strain gage NBS 5B as well as ceramic cements which showed greater electrical resistivity than had been observed previously in the range 800 to 1800° F. Also, a technique was devised for increasing the resistance to ground by applying a fired-on ceramic coating to the grid of a specially developed unbacked gage.

Gas-Fired Cupola

ACCORDING to an article, "Research and Experience in the Operation of a Cupola with Natural Gas Partly Replacing the Coke" by Kletskin, Sobol, Dyakonov, Rabinovich, and Yao in the January issue of the Russian *Liteinoe Proizvodstvo* (BCIRA translation), a melting rate of about 11.2 (net) tons per hour is obtained with a cupola lined to 51.2 in. with 10 per cent coke and about 10,600 cu ft per hour of gas at NTP. Blast input to tuyeres is given as 176,550 cu ft per hour, and the metal temperature 2600° F. By increasing the gas consumption to 15,900 to 17,650 cu ft per hour and the blast to the tuyeres, the melting rate can be increased 20 to 25 per cent.

METALGRAMS

. . . news of "Electromet" ferroalloys and metals

UNION CARBIDE METALS

SEPTEMBER 1961

SALUTE TO STEEL FOUNDRIES -- In 1861, the first steel castings made in the United States were poured in Buffalo, N. Y. They were railroad castings, still an important application of steel castings today. This year, steel foundries observe their first 100 years of serving the railroad, earth-moving and construction equipment, rolling mill, mining equipment, military, oil and gas, automotive, and other industries. Some 275 foundries in the U. S. and Canada can pour about 2 1/2 million tons per year for these uses. Union Carbide Metals wishes the steel foundry industry continued growth and success and looks forward to serving its ferroalloy needs in the future. Your UCM representative is always at your service.

* * *

CHROMIUM STRENGTHENS CAST IRON -- Chromium has a stronger effect on the microstructure and properties of cast iron than any other inexpensive alloying element. As little as 0.25 per cent increases uniformity, hardness, strength, and wear resistance. Larger amounts, from 0.75 per cent to as much as 30 per cent, make cast iron resistant to heat and oxidation. Chromium can be added to the cupola charge or the ladle. Union Carbide Metals produces chromium briquets and lump ferrochrome for cupola additions and crushed ferrochrome that dissolves quickly in the ladle. Ask your UCM representative for further details.

For more information circle 551 on page 39

* * *

AN EFFICIENT BLOCK -- Why is silicomanganese the most popular blocking alloy in the steel industry? The alloy dissolves rapidly, giving faster blocks and shorter blocking times. It allows higher recoveries and closer control of manganese and chromium added to the furnace. It also improves steel cleanliness. Silicomanganese also may be used for low-cost ladle additions. For further information, write for a new 12-page bulletin, F-20,166.

For more information circle 552 on page 39

* * *

SELECT AN ALLOY -- Are you looking for a strong graphitizing inoculant to improve the machinability of gray iron? Or a low-cost magnesium alloy to produce ductile iron? Or a low-carbon ferrochrome that will meet the low-carbon specifications of stainless steel? You can find the answers in the new "Electromet" Ferroalloys and Metals Selector that contains a complete list of alloys for steel and iron. It lists the composition and suggested use of each alloy . . . so you can select the one you need. For a copy, write for 20,119.

For more information circle 553 on page 39

* * *

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. In Canada: Union Carbide Canada Ltd., Toronto.

"Electromet" and "Union Carbide" are registered trade marks of Union Carbide Corporation.

COST-CUTTER

The only accurate way to measure your abrasive costs is to determine *cost per ton of castings cleaned—not* just cost per ton of abrasive.

Rotoblast Steel Shot and Grit clean castings at lower cost per ton than other abrasives. That is why Rotoblast Steel Abrasives are the fastest growing on the market today. *Sales volume has tripled in 3 years.*

Low phosphorus, low sulfur steel and a special heat-treating process make Rotoblast Steel Shot and Grit solid, tough and free of voids and hollows—that's why they can save you so much on cleaning costs.

For actual figures, write to: PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Maryland; Pangborn Canada Ltd., 47 Shaft Rd., Toronto (Rexdale), Canada;—*Manufacturers of Rotoblast® Steel Shot and Grit®; Blast Cleaning, Vibratory Finishing, Dust Control Equipment.*

Pangborn
OF HAGERSTOWN

ROTOBLAST
STEEL SHOT & GRIT

Purdue Foundry Conference To Be Held Oct. 26-27

Annual Purdue Metals Casting Conference will be held at the university, Lafayette, Ind., on Thursday and Friday, Oct. 26-27. It is sponsored by the university in cooperation with Michiana and Central Indiana Chapters of the American Foundrymen's Society.

Technical sessions are scheduled for Thursday morning and afternoon and Friday morning. The annual conference dinner will be Thursday evening. Program details follow:

Thursday, Oct. 26

8:45 a.m.—Registration.

9:15 a.m.—Special Session: "Toshiba in Progress," film courtesy of Tokyo Shibaura Electric Co., Tokyo, Japan.

10:00 a.m.—General Session: Welcome address, Dr. John W. Hicks, assistant to the president, Purdue University. Response from Thomas T. Lloyd, vice president, Albion Malleable Iron Co., Albion, Mich., regional vice president, AFS.

10:45 a.m.—Technical Session: "Future of the Foundry Industry," Bruce L. Simpson, president, National Engineering Co., Chicago.

11:45 a.m.—Luncheon: "What Is a Foundryman?" Carl Schopp, Link Belt Co., Indianapolis, national director, AFS.

1:30 p.m.—Sectional Meetings:

Nonferrous: "An Optimum Melting Method for Every Production System," D. L. LaVelle, American Smelting & Refining Co., South Plainfield, N. J.

Iron: "Foundry Engineering in Europe," Louis Pedicini, survey engineer, Lester B. Knight Co., Chicago.

Steel: "Core Economy," H. G. Robertson, manager, American Steel Foundries, Alliance, Ohio.

3:00 p.m.—Sectional Meetings:

Nonferrous: "Effect of Design on Making of Nonferrous Castings," William M. Ball Jr., R. Lavin & Sons Inc., Chicago.

Iron: "Perspectives in Ductile Iron," David Matter, Ohio Ferro Alloys Corp., Canton, Ohio.

Steel: "Economics in Arc Air," Dale Hall, works manager, Oklahoma Steel Casting Co., Tulsa, Okla.

6:00 p.m.—Dinner: "Money," Richard F. Mills, Indianapolis.

Friday, Oct. 27

9:00 a.m.—Technical Session: "Quality Control and Marketing," Tom E. Barlow, Eastern Clay Products Div., International Minerals & Chemicals Co., Skokie, Ill.

10:15 a.m.—Technical Session: "Dollars in Sand," Clyde A. Sanders, vice president, American Colloid Co., Skokie, Ill.

11:30 a.m.—Technical Session: "Furfural Applications," Wayne Buell, vice president, Aristo Corp., Detroit.

12:30 p.m.—Adjournment.

Industrial Engineers To Meet Nov. 1-3 in Chicago

The Industrial Management Society will hold its 25th Anniversary Industrial Engineering and Management Clinic Nov. 1-3 at the Pick - Congress Hotel, Chicago. Technical sessions at the clinic will feature discussions of the latest developments in time and motion study, work simplification, job evaluation, methods, operations research, automation, plant layout, and labor relations. For more details, write to the society at 330 S. Wells St., Chicago 6, Ill.

Here's what foundrymen say

about this PAYLOADER® model

Asst. to President says, "We've used PAYLOADER units since 1945 and now have five HA's for over a year, working as many as 16 hours a day. They have required no maintenance other than regular greasing and similar services."

Asst. Gen. Mgr. says, "Our entire operation depends on the fast handling we get from our (HA) PAYLOADER units and so far they haven't let us down. For all the good service they've given us, we can't take a chance on anything less reliable."

President says, "We purchased our first HA PAYLOADER on a trial basis and have since bought two more. All three are working out very satisfactorily, and maintenance costs have been at a minimum."

Foreman says, "After some 20 months of use, the HA PAYLOADER has given outstanding service. We depend on it 11 hours a day, 240 days a year."

Vice President says, "The roll-back bucket is a distinct advancement over the old straight-type bucket — results in faster, cleaner operations and bigger payloads."

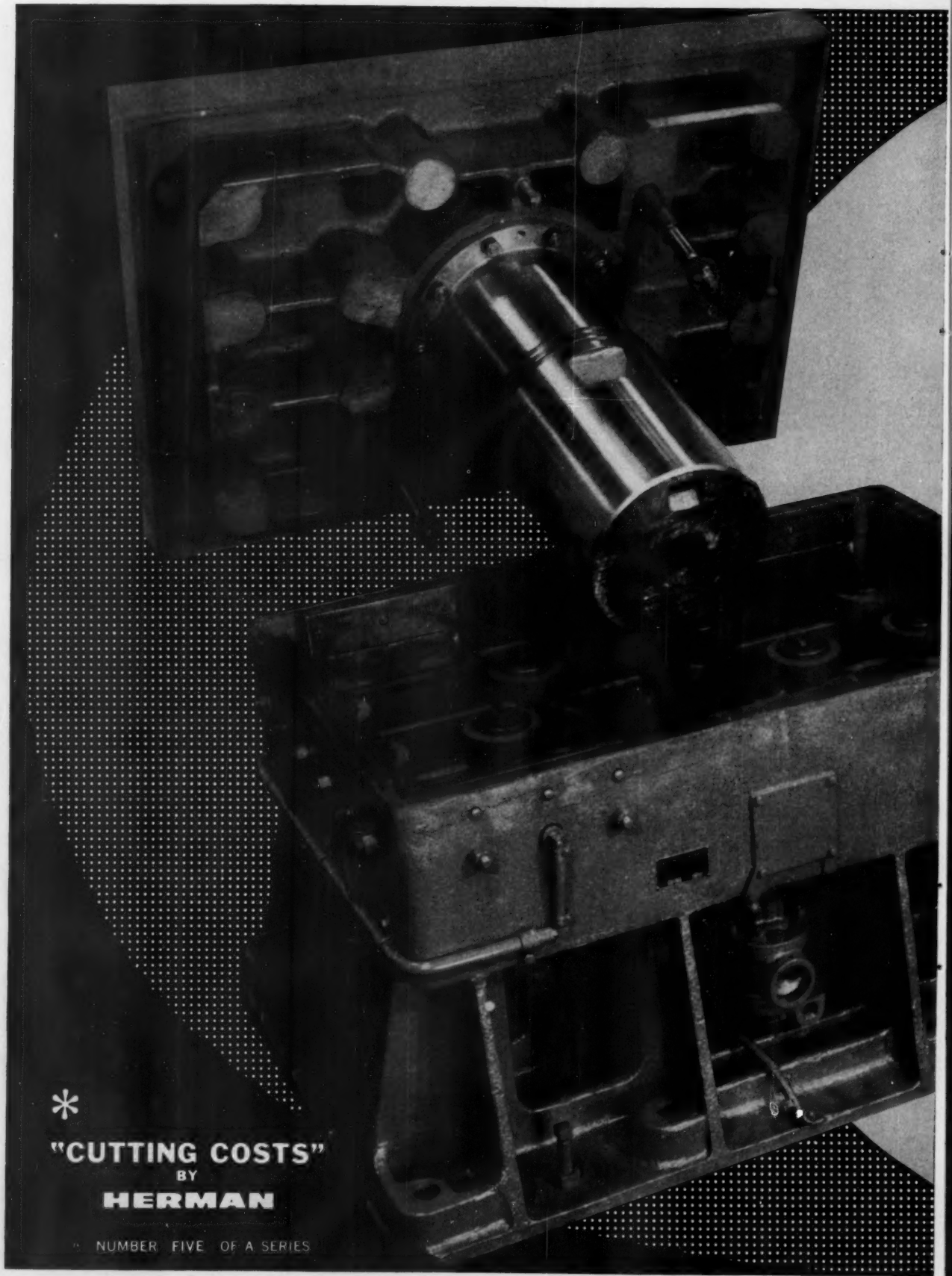
Your Hough Distributor invites you to find out how an HA PAYLOADER can speed up production and reduce handling costs in your plant. He'll demonstrate the HA's 2,000-lb. operating capacity, the 40° bucket tip-back at ground level, its single-lever bucket control and short turning radius. Other operating features on the HA include a closed hydraulic system, torque converter drive and a full reversing transmission with two speeds in either direction. Also available: Model H-25 featuring 2,500-lb. operating capacity, full power-shift transmission with matched torque converter, power steering, 6-ft. turning radius. Ask for complete details or return the coupon below.

HOUGH®

THE FRANK G. HOUGH CO.
703 Sunnyside Ave.
Libertyville, Ill.
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

☐ Send Model HA data
☐ Send Model H-25 data

Name _____
Title _____
Company _____
Street _____
City _____ State _____
9-A-3


*
"CUTTING COSTS"
BY
HERMAN
NUMBER FIVE OF A SERIES

Several Thousand Jolt Machines Can't Be Wrong

The Herman Jolt Machine • at rest.

• Rugged table plate and plunger removed for examination.

HERMAN:
Best Known and Most Progressive Name in Engineered Molding Machines.

Our records on the operating efficiency of the Herman Jolt Machine provide outstanding proof of its dependability and ruggedness . . . under severe foundry conditions in thousands of installations around the world.

It is truly the work-horse in our line of quality machines and is particularly suited for certain molding specifications.

Most importantly, the Jolt Machine *strikes over the entire surface of the machine base,* ramming a harder mold as a result.

It is being used by a tremendous variety of foundries, in capacities from 615 to 140,000 lbs.

Heavy-duty table plates and plungers are used on all machines, as well as wearing plates at the corner of the machine base which maintain alignment at all times. Wear at the cylinder and plunger is reduced to a minimum.

All Jolt Machines incorporate the Herman "Bunter-Control" operating valve which proportions the amount of air to the load of the machine.

There is a Herman Sales Engineer near you to provide more information on this outstanding machine.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

HERMAN PNEUMATIC MACHINE CO.
UNION BANK BUILDING,
PITTSBURGH 22, PA.

3554-HP

For More Information Circle 627, Page 39

By RALPH L. LEE, *President*
Lee Hobby Foundry, Birmingham, Mich.

An Engineering Casting Service

"The casting process should be regarded as a legitimate engineering and experimental tool which is readily available to designers"

● IT CERTAINLY would be safe to say that most of the popular metal products made and sold today were born in some tinker shop where imaginative doodling took form under some name such as research, invention, product development, or engineering.

Regardless of the name given the activity, however, hunches, speculation, ideas, or other forms of brainstorming were converted into pieces of metal, assembled, and proved to be either a good business bet or a pipe dream.

It would be nice to think, in this enlightened day of superduper science and engineering magic, that with the aid of electronic brains and regimented genius, a new product could be worked out completely in collective imaginations and coagulated into sets of blueprints and punched tapes which would be fed into wholly automated machine tools.

But the process doesn't work that way, as even the most successful engineers will admit reluctantly—among themselves, at least, or behind closed doors. Invariably there has to be one whale of a lot of tinkering, cut-and-try, premise shattering, and boner facing before the newborn babe can catch his breath, let alone stand on his own two feet. Chances are that the more revolutionary the product, the more grunting and groaning in the delivery room.

Anything Goes — The first great challenge in such an undertaking usually is, "Can we get the darned thing to work at all, no matter how we do it or what we do it with?" Late into the night, emergency components are hogged out of solid chunks. Inappropriate materials are used because they are the only ones at hand. Awkward processes

Late into the night, work goes on

are employed because the equipment is handy. Any means to immediate end are employed in an emergency to get the thing to work at all.

The greater the struggle and the longer it takes, the more sacred each rivet, screw, bolt, or piece of haywire involved in the successfully operating creation becomes. Because of this situation, fights are likely to take place between the recuperating mother of the babe and the squads of toolmakers, production experts and purchasing personnel who dare to suggest substitutions for the sacred components of the original.

Fearing that I might be taking poetic license with this situation, I checked with the retired chief engineer of one of our internationally known and respected organizations. He smilingly nodded his head and commented, "How true, how true."

Compromises Persist — In any event, when the final showdown takes place, and the form finally is locked in the production program, compromises have been made. Short pieces of haywire and other illegitimate substitutes for castings still remain. At this point foundrymen are invited in.

In the Lee Research Center (a subsidiary of the Lee Hobby Foundry), the entire staff has a bias —almost a phobia—regarding the economical use of castings in research and product development work. With only one member on the staff, who also doubles as foundryman, the difference between hogging complicated components out of solid metal and the making of appropriate shortrun patterns and castings stands out like a sore thumb. The same thing holds true with choices between other fabrication processes and castings. Casting is looked on as a legitimate engineering and experimental tool which is close at hand.

The point I'm trying to make is this. When, through custom or

coke...tested and retested...
to give you <u>better melting</u> in your cupola

Coke that gives optimum performance in the cupola doesn't "just happen." It's the result of quality control from mine to cupola—and this includes testing every step of the way.

Every day in every Semet-Solvay coke plant, continuous tests are conducted to determine and control product quality and uniformity: Chemical tests, pyrometric tests, physical tests. Shatter tests, specific gravity tests, porosity tests.

Result: Coke that is low in ash and sulphur, high in carbon, strong and uniform . . . to super-heat and melt your metals in the hottest, fastest, most efficient cupola operation you can possibly have.

For the whole story, write Dept. 613 - F today for our just-off-the-press brochure, "The Advantages of Using Semet-Solvay Foundry Coke."

SEMET-SOLVAY DIVISION
40 Rector Street, New York 6, N.Y.

Allied Chemical
BASIC TO AMERICA'S PROGRESS

For More Information Circle 628, Page 39

tradition, engineers look on castings only as a quantity production facility, not as an engineering tool, many products are apt to go into production with costly substitutes for castings. This contention isn't just theory. All we have to do is to look around a bit.

This same, unrealistic blindness also might apply to foundrymen, who, steeped in quantity production, easily could lose sight of castings as an engineering tool. Far more important, they might lose sight of the sales promotional opportunity of getting in on the ground floor before the production form is locked.

This discussion may seem to be going around Robin Hood's barn in an effort to suggest a Department of Engineering Casting Service for drumming up trade, but something tells me that the possibility will haunt us as we face the need for sales.

New Attitude Required—Should the idea take hold, we'd have to get out of the quantity production pattern rut and consider the wide range of cost-cutting opportunities which exist between metal cope and drag patterns and specially tailored patterns for one-shot use. Overheads based on economical quantity production would have to be sheared when applied to this limited service. If looked on primarily as a business-getting effort, this work might well be subsidized, in part at least, by the sales department of the company.

Regardless of how far we dare to go in this direction, getting in on the ground floor while new or changed products are in the plastic stage seems to me to be a must. I assure you that I know it is from my early engineering experience. I had foundrymen friends who dropped in on me regularly to see what was up. In fact, became almost partners in our development work. I know for a fact that they profited by it, for every once in a while we hit the jackpot.

NON-FLUID OIL KEEPS AIR TOOLS RUNNING AT FULL SPEED AND POWER

TRADE MARK REGISTERED

Ordinary oil separates from water

NON-FLUID OIL

TRADE MARK REGISTERED

emulsifies with water

If you are not using the "NR" grades of NON-FLUID OIL as the lubricant for your pneumatic tools you are not securing most efficient service. Here's why:
Air-borne moisture is the greatest cause of loss of power and speed in air tools. But, unlike ordinary oils, "NR" grades of NON-FLUID OIL have been specifically designed to absorb this moisture into the lubricating film. This insures perfect lubrication, allowing tools to run at top speed and power, with no danger of rusting, sticking and excessive wear.
Write today for a free sample of "NR" and Bulletin 550 and make this test: Take an air tool which is back in Tool Crib because of lack of power. Fill the back-end of the tool with "NR," replace the air line and within a few seconds you will hear and feel the tool pick up speed and power. When "NR" is used regularly, tools remain at top speed and power and stay in service without chronic Tool Crib Maintenance.

1898 65 YEARS 1961

NEW YORK & NEW JERSEY LUBRICANT COMPANY
292 MADISON AVE., NEW YORK 17, N. Y.
WORKS: NEWARK, N. J.

WAREHOUSES • ATLANTA, GA. • BIRMINGHAM, ALA. • CHARLOTTE, N. C. • CHICAGO, ILL. • COLUMBUS, GA. • DETROIT, MICH. • GREENSBORO, N. C. • GREENVILLE, S. C. • PROVIDENCE, R. I. • ST. LOUIS, MO. • Also represented in principal industrial centers, in Pittsburgh, Pa., Cleveland and Cincinnati, Ohio.

NON-FLUID OIL is not the name of a general class of lubricants but is a specific product of our manufacture. So-called grease imitations of a NON-FLUID oil often prove dangerous and costly.

Mold Control Course Offered By Harry W. Dietert Co.

Free instruction on a new method of sand mold control is being offered by the Harry W. Dietert Co., Detroit. Lectures and demonstrations, as well as actual sand preparation work and molding, make up the 2½-day course. Classes will be limited to 25 and will be held weekly in Detroit during October, November, and December, starting every Monday at 9 a.m.

For registration forms and additional details, write to Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4, Mich.

Western New York Chapter Elects 1961-62 Officers

Officers for 1961-62 have been elected by the Western New York Chapter, AFS. They are Ronald E. Turner, Queen City Sand & Supply Co., Buffalo, chairman; Philip S. Savage, McCallum Bronze Co., Buffalo, vice chairman; Leonard Greenfield, Samuel Greenfield Co. Inc., Buffalo, treasurer; and Bruce Artz Jr., Pangborn Corp., Snyder, N. Y., secretary.

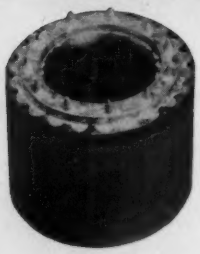
For every job . . . an Ansco X-ray product

Varied film emulsions for maximum penetrometer sensitivity . . .
Versatile packages that take the work out of film handling . . .
Your Ansco representative is a trained X-ray specialist who will render quick service on a personal basis—Another example of the extra service you get when you buy Ansco. *Ansco, Binghamton, N. Y., A Division of General Aniline & Film Corp.*

For More Information Circle 630, Page 39

Ansco

Industrial X-ray



Diecasting Offers Improved

ROTOR ASSEMBLY METHOD

By DELBERT RITZHAUPT
Dominion Electric Corp.
Mansfield, Ohio

● DIECASTING has found a useful application in the production of rotor assemblies for small electric motors. Dominion Electric Corp., Mansfield, Ohio, no longer uses the old technique of fastening rotor laminations and end rings together with copper pins, then staking, soldering, or welding them. Instead, diecasting is used to make each rotor into a solid unit.

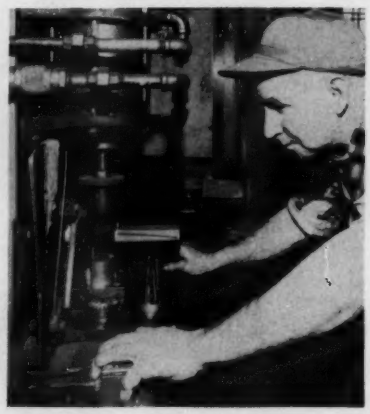
Machine used for the process was manufactured by Denison Engineering Div., American Brake Shoe Co., Columbus, Ohio, and consists of a 35-ton hydraulic C-frame press with a 25-ton ejection ram mounted under the bedplate. Normally, this machine is used for a wide variety of forming, assembly, and cutting operations. With minor changes in valving sequence and accessories, the press is now casting aluminum at temperatures between 1300 and 1340° F. The operation marks a change from normal horizontal action involved in diecasting machines.

Three Operators — Three workers, operating the press and auxiliary equipment, can produce 600 to 650 completed rotors per 8-hour shift. All equipment necessary to the complete operation is stationed in the immediate press area, where operators can perform as many as two or three operations each per molding cycle.

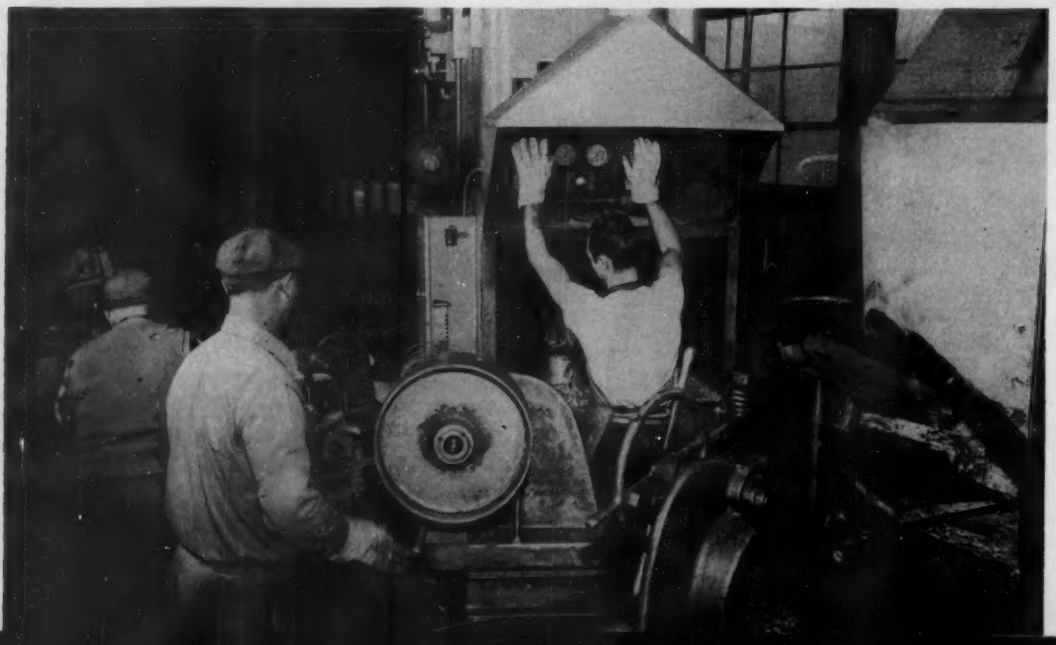
First step is to separate and measure, on a small air scale, the correct number of laminations (plus or minus one) required for each rotor. Usually, 70 laminations per 1½ in. stack are used in each rotor.

Next, a roll spring pin is inserted

Finished diecast rotors, showing an end ring casting and (at bottom right) the diecast slots which bind components together



View shows lamination stacks being weighed (foreground) and stacked



Press operator begins cycle by pressing buttons. Worker at left stakes laminations while the third worker places laminations in molds and removes completed molds from fixtures

Circle 631, Page 39→

"PASSING THE BATON"—FROM WHITING TO WHITING

The big Whiting Distributing Ladle has been storing the melt. Slag, rising to the top, has hardened to form a natural lid and retain the heat below. Now the "baton" — a stream of slag-free metal — is passed through the outside teapot spout into a Whiting Pouring Ladle with bottom tap for final relay to the molds.

This scene is typical of efficient foundry operations throughout the world. Whiting engineers, practical foundrymen themselves, have designed more than 200 types and models of metallurgical ladles to reduce costs, speed output and improve casting quality in every pouring operation. If you have a special need, they'll design a special ladle to meet it precisely. And there is no charge for this service. See your local Whiting rep or write direct.

FREE: Bulletin FY-163-R, *WHITING LADLES.* Forty pages of illustrated ladle models and accessories to cut your casting costs. Write for it today. *Whiting Corporation, 15607 Lathrop Avenue, Harvey, Illinois. In Canada: Whiting Corporation (Canada) Ltd., 350 Alexander Street, Welland, Ontario, Canada.*

90 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

WHITING

FOUNDRY EQUIPMENT

MANUFACTURERS OF CRANES; TRAMBEAM® HANDLING SYSTEMS; PRESSUREGRIP; TRACKMOBILES®; FOUNDRY, RAILROAD, AND SWENSON CHEMICAL EQUIPMENT

This is the first in a Series of Comments on various and vital aspects of Service in the Ferroalloys Industry.

at Vanadium Corporation of America

SERVICE COMES FIRST

Over 55 years ago when we began business as one of the first U.S. producers of ferroalloys,the factors of Price, Quality and Service were, even as they are today, the governing features of any progressive business organization. But time has proven that their interrelationship has changed; Service has now taken on new importance.

Service is Vital The first two—Price and Quality—are actually basic. It is obvious that the producer must charge a competitive price or his goods pile up on the shelves—unsold. He must also offer quality merchandise or his customers soon go elsewhere. Service, on the other hand, varies widely from producer to producer, and it is in this area that the buyer stands most to gain.

Service, however, cannot stand alone without the supporting influence of a fair return for the product sold, which not only makes available a quality product but also allows the producer to explore for new low-cost sources of raw materials, to maintain modern efficient production equipment, supply technical service and carry on the all-important Research and Development activities.

Few Offer All Three We believe that any producer in our industry today who does not provide for all three—Price, Quality and Service—is failing in his responsibility to his customers. Nearly all producers offer competitive price—somewhat fewer furnish top quality—but the great majority, including suppliers of foreign-produced material, are not prepared to extend more than minimum service.

Vanadium Corporation, on the other hand, offers you complete service. Here's what we mean:

Our Own Mines—Integrated mining and milling facilities provide, on a long-term basis, a consistent supply of high grade ores of controlled quality. Producers who rely on the purchase of distressed lots in the world market may temporarily profit but jeopardize the customers' requirements for a dependable and continuing supply of quality products.

Modern Plant Facilities—Our plants are among the most modern in the industry and are strategically located near consuming industries.

Production Planning—An extensive production-planning group assures you of an adequate supply of quality products—when you need them! Expeditious handling of every order is facilitated by a private network of teletype equipment linking district offices, plants, Research Center and headquarters offices.

Research Center—We are among the few ferroalloy producers who can claim the distinct advantages of fully equipped modern research facilities. This R and D supervision, over short-and long-term work, assures the development of new and better products, and provides adequate technical customer service.

Pilot Plant—Here complete facilities prove a product under actual operating conditions before it is ever offered commercially. The plant also provides complete customer service.

Engineering Sales—Widely experienced technical field personnel are located in district offices near you, always on call.

Field Stocks—Adequate stocks of required products are available in mill quantities when you need them.

Distribution—Vancoram Products are available from distributors with warehouses conveniently located throughout the country.

Over 4,000 VCA employees staff these facilities with a devoted interest in you—the customer. When you think of ferroalloys—think of Vancoram, where SERVICE COMES FIRST.

SERVICE COMES FIRST

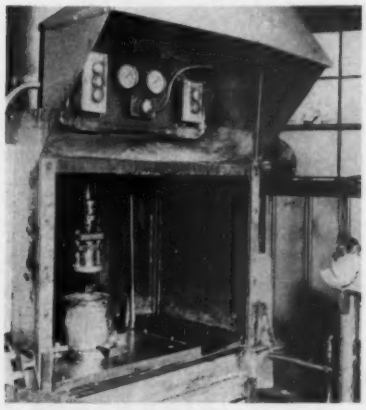
VANADIUM CORPORATION OF AMERICA

420 Lexington Ave., New York 17, N.Y. · Chicago · Cleveland · Detroit · Pittsburgh

through the center hole of the laminations, so that they will be held together in the mold. A small air press keeps the laminations tight on the skewing fixture while the pin is inserted. The spring pin is removed following diecasting to permit insertion of the permanent rotor shaft.

After laminations have been positioned around the spring pin, the assembly is located in a mold and then placed in a holding fixture. Four holding fixtures are used alternately so that they will be sufficiently cool to handle when loaded with the next set of laminations. Also, using cool fixtures helps to keep the pot temperature at proper levels.

The press operator inserts the loaded holding fixture into a recessed fixture attached to the bottom of the press top ram. Below the ram is a pot into which the holding fixture and mold are moved by the top ram for the diecasting shot.



Hydraulic press is tooled for aluminum diecasting operations. Bottom ram moves up through the charge pot which can be seen just below the top ram. A protective door closes after both cycle-start buttons are pressed

After coating the inside of the pot with die lubricant, the operator fills the pot with molten aluminum, (99 plus alloy), using a small ladle. The amount of aluminum poured each time and the speed at which the operator works, all help to regulate the temperature. The melting furnace is immediately behind the operator.

Pushbutton Operated—After the pot has been charged with molten aluminum, the operator actuates two cycle start buttons, one with each hand. Both buttons must be held down until a metal safety door moves up over the work area of the press to screen the operator from the casting shot. If the operator fails to maintain pressure, the door returns to the full open position and the casting sequence will not continue, thereby assuring that the operator never is exposed to the actual casting shot.

Uses 22-Ton Pressure

When the door is closed, the top ram moves down, pushing the mold into the charge pot. Currently, a maximum of 22 tons pressure is being exerted on the top ram. When in molding position, a limit switch is tripped, and pressure is held for 4 seconds inside the pot. The pressure causes the molten metal to flow up through the end ring mold and fill a series of slots around the circumference of each lamination. The laminations now are bound together by a network of aluminum. When the molding cycle is completed, the top ram is de-energized while still in the pot.

At this point, the bottom ram (the top of which serves as the bottom of the charge pot) moves up at 8 tons pressure, pushing up the completed mold, holding fixture, and top ram. As soon as the mold is clear of the charge pot, the bottom ram de-energizes, returning to position by line oil pressure—approximately 500 lb. At this moment the top ram reactivates, returning the holding fixture and completed mold to an elevated position.

Bottom ram action assures that the completed mold clears the charge pot after the shot. Otherwise, the ram might jam because of the clinging action of the hot metal involved.

Slug's Remelted—With the mold cycle completed, the operator removes the holding fixture and, with an air wedge, removes the slug on the bottom of the mold. These slugs feed directly into a gravity channel back to the melting furnace. Approximately three 30-lb ingots of aluminum are needed for a full shift run.

The completed casting is removed from the mold by another operator, who also removes the spring pin;

KEEP IT MOVING

YOU CAN COUNT ON CLEVELAND FOR THE VIBRATOR* THAT MEETS YOUR FOUNDRY REQUIREMENTS

SA MATCHPLATE
LA SPRINGLESS
F HOPPER
KO BIN
LSH SHAKEOUT
RC-50 BIN
VG CORE DRAW
C MACHINE
CIR ROLLOVER
CBS MACHINE
T MACHINE
LSRR PORTABLE

* AIR OR ELECTRIC
* PERMANENT OR PORTABLE
* SILENT OR STANDARD

8378-CV

WRITE TODAY FOR COMPLETE INFORMATION

Bin Stuck Lately?

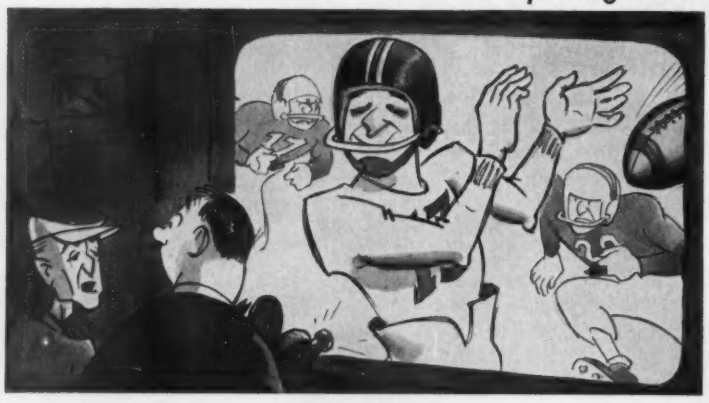
THE CLEVELAND VIBRATOR COMPANY

2788-9 Clinton Ave. • Cleveland 13, Ohio

For More Information Circle 633, Page 39

Mr. SHOTT and Mr. GRITT

"You and your movie camera are ruining our team's passing attack!"



For a better finish

start with AMSTEEL SHOT AND GRIT

GENUINE ELECTRIC FURNACE STEEL ABRASIVES

ALLOY METAL ABRASIVE COMPANY

ORIGINATORS OF CAST STEEL SHOT

121 South Division Street, Ann Arbor, Michigan Phone: NOrmandy 3-8529

For More Information Circle 634, Page 39

CHILL KOOLHEAD NAILS

Chill Nails and Spiders

You can rely on "KOOLHEAD" and "STANHO" products

for... ACCURATELY CONTROLLED FOUNDRY CHILLING

Write for samples and prices

Choose any style from Jumbo to Stubby; slim, medium or horse nail blade; blunt, pointed, straight or 90° bent. There's a type and size Koolhead Chill Nail or Spider Chill to do your specific chill job best.

STEEL Stanho PRODUCTS

the Quality Line

- WOODRUFF KEYS
- MACHINE KEYS
- MACHINE RACK
- TAPER PINS
- COTTER PINS
- SPECIAL PARTS

and other Stanho products Bulk or Packaged

WRITE for CATALOG and PRICES

STANDARD HORSE NAIL CORP.

Since 1872 NEW BRIGHTON, PA.

For More Information Circle 635, Page 39

the complete unit is now ready for machining and insertion of the permanent rotor shaft.

All sequencing described above was designed by Denison engineers to requirements outlined by Dominion Electric plant engineers. Certain other alterations were necessary where it was found intense heat being generated around the bottom ram caused serious deterioration of ram packing. Two 16-in. fans were mounted behind the press on floor level, to push cool air into the area. Next holes were drilled in the lower ram stem (which is bored out hollow) so that cool air could be pushed through the ram and around the charge pot and the ram itself. It also was necessary to rig a venting hood in front and above the press to draw off smoke and fumes created by the die shot.

Bring Melt to Temperature

A separate valve, actuated by a single button on the press control panel, was installed to permit separate raising of the bottom ram above the level of the charge pot. In the morning, before the pot is hot enough for molding operations, the pot is charged several times with molten aluminum. The bottom ram is then raised, and the slug is simply knocked off. This procedure raises the pot to shot temperature.

Clearance between the walls of the charge pot and the bottom ram is 0.025 in. Under ordinary circumstances, a clearance of 0.005 in. would be sufficient, but allowance is made for thermal expansion and for the carbon coating which forms rather quickly on the ram surface during operations. Carbon coating, however, does not present a serious problem because it is easily knocked off through the action of the ram itself.

Production time is not significantly greater than with the old method. But Dominion Electric engineers say that costs have been decreased by reduced labor required, use of aluminum in place of copper which was used before, and improved rotor quality. Because connecting pins and end rings are now one solid piece of metal, binding laminations together, danger of loose connection in the rotor is sharply reduced.

CP-3190 Vertical Grinder with 6" cup wheel and guard. Weighs only 7 lbs.

CLEAN UP CASTINGS FAST ...with CP GRINDERS and CHIPPERS

CP Air-Powered Grinders have a tremendous power reserve that lets you really lay into the job... and there is no speed sag under load. You can get the most out of abrasive wheels because they run at full rated speed even when the going is rough. Learn how these lightweight... easy to handle grinders, polishers and sanders keep metal removal costs low...production records high.

You will find that CP has the right answers to your metal removal problems. There is a wide selection of foundry-proved tools to choose from: Straight or Vertical Grinders... Die Grinders... Small Wheel Grinders ...Wire Brush Machines, Chippers and Scalers.

For full details write: *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N.Y.*

CP Simplate Chipping Hammers hit hard, throttle smoothly and handle easy.

CP-401 Single Scaler with stellite tipped piston strikes 7,000 blows per minute . . . gives years of hard service. Triple Scaler available.

CP-3221 Straight Grinder available with straight, pistol grip or lever handle for wheels up to 8". Acoustic Silencer keeps exhaust noise low . . . performance high!

Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC TOOLS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS

Another Test System at work...

J. E. Rambo, (center) Magnaflux Field Engineer discusses test operations with Chief Metallurgist S. W. Gearhart, and Operator Richard Erich, Birdsboro Corporation, Birdsboro, Pa.

Cuts Test Time on 1½-ton Castings from 8 Hours to 30 Minutes

New Magnaglo Unit Eliminates Production Bottleneck

The problem was easy to see—too much time and too high costs by older methods for inspecting big, complex-shaped castings. This new Magnaglo CRV-8 solved it with these results: . . . Testing time was reduced 90%, number of tests per casting was reduced 55%, four operators were released for other production tasks. *The CRV-8 will have paid for itself in its first year of inspection!*

Such results are possible with large castings and complicated welded or cast-weld assemblies because of the recently developed multi-directional magnetization with 8,000 ampere current, or more. One, two or three quick directional "shots," inspect under black light and the whole job is done—by one man! Every defect you *need* to find is precisely located and defined. No over-inspection, no under-inspection.

This multi-directional magnetization is another example of Magnaflux's ability to engineer and supply Test Systems for just about any nondestructive test requirement—common or highly specialized—with standard, productionized-standard, or custom units. Do you have a test need? Tell the Magnaflux Field Engineer, or write Magnaflux Corporation, 7350 W. Lawrence Avenue, Chicago 31, Illinois.

MAGNAFLUX CORPORATION
TEST SYSTEMS

A SUBSIDIARY OF GENERAL MILLS

MAGNETIC PARTICLE • FLUORESCENT PENETRANT • ULTRASONIC
EDDY CURRENT • STRESS ANALYSIS • RADIOGRAPHY
DYE PENETRANT • MAGNETIC FIELD MEASURE • THERMOGRAPHIC

For More Information Circle 637, Page 39

Gray Iron Founders' Society Meets in Toronto Oct. 19-20

The Gray Iron Founders' Society will hold its 33rd annual meeting at the Royal York Hotel, Toronto, Canada, on Oct. 19-20, 1961. The program has been developed around the theme of progress through association-sponsored research, and the featured speaker will be Henton Morrogh, director, British Cast Iron Research Association, Alvechurch, Birmingham, England. Premiere showings of three GIFS films also will be presented. Program details follow:

Thursday, Oct. 19

9:15 a.m.—Reports of the president and the treasurer.
10:00 a.m.—Premiere showing of GIFS film, "Straight Line to Production."
10:45 a.m.—Comments of legal counsel, C. C. Williams Jr., Jones, Day, Cockley, & Reavis, Cleveland.
11:15 a.m.—"The Business and Political Climate We Live In," Hoyt P. Steele, General Electric Co., New York.
12:30 a.m.—Industry Luncheon. Presentation of 1961 Design Contest Awards by A. D. Kaill, editor, *Design Engineering* (of Canada), Toronto, and chairman, 1961 GIFS design contest judging committee.
2:00 p.m.—"Progress Through Research," Allen M. Slichter, Pelton Steel Castings Co., Milwaukee.
2:45 p.m.—"What BCIRA Is and How It Works," and "Current and Recent Gray Iron Research Activities of BCIRA," Henton Morrogh, director, British Cast Iron Research Association, Birmingham, England.
7:30 p.m.—Industry Banquet.

Friday, Oct. 20

9:15 a.m.—Premiere showing of GIFS films, "Casting Design & Analysis" and "Cost Saving Design Shortcuts." Progress report of GIFS film program, Richard C. Meloy, marketing director, and Charles F. Walton, technical director.
10:30 a.m.—Report on "Operation Vitalization," James Crowley, Pioneer Foundry Co., Jackson, Mich., chairman, GIFS advertising committee.
11:00 a.m.—"Operation Crossroads," a progress report on GIFS technical-economic research survey of customer industries, by R. W. Hale, head, Metals and Minerals Economics, and H. W. Lownie, chief, Process Metallurgy Research, Battelle Memorial Institute, Columbus, Ohio.
12:30 p.m.—Industry Luncheon. Introduction of new officers and directors. Presentation of 1961 citations and awards by Hermann P. Good, chairman Citations and Awards Committee and presentation of 1961 EMGAM awards. "Cave Man to Space Man," J. Lewis Powell, author, lecturer, and consultant.
3:00 p.m.—Discussion Sessions
Ductile Iron: John Perry, chairman, GIFS ductile iron committee, presiding, and Henton Morrogh, BCIRA, contributing.
Technical: John H. Culling, chairman, GIFS technical committee, presiding, and Charles F. Walton, GIFS, contributing.
Marketing: Oscar Sundstedt, chairman, GIFS marketing committee, presiding, and Richard C. Meloy, GIFS, contributing.
4:30 p.m.—Adjournment

AFS Chapter Elects Officers

Myron E. Boyd, president and manager of Maumee Pattern & Mfg. Co., has been elected 1961-62 chairman of the Toledo Chapter, American Foundrymen's Society. Other officers are Russell J. Smith, Unitcast Corp., vice chairman; LeRoy F. Schultz, Freeman Supply Co., secretary; and Warren A. Burwell, American Brake Shoe Co., treasurer.

WADSWORTH SQUARE TWISTED SOFT STEEL GAGGERS

★ **LOWER COST . . . More pieces per pound! Twisting a square steel bar creates rigidity and strength. Less steel is required.**

★ **COMPARE SQUARE TWISTED**

Size Before Twisting	Size O.D. After Twisting	Weight lbs. per ft.	Equivalent Round Steel RE or Plain: Weight lbs. per ft.	Equivalent Round Steel RE or Plain: O.D. Size	Square Twisted Gives: More Pieces by
3/8"	1/2"	.478	.668	1/2"	39%
1/2"	5/8"	.85	1.04	5/8"	22%
5/8"	7/8"	1.33	2.04	7/8"	24%

Get your copy of our new GAGGER COUNTER CHART. It shows pieces per cwt. and weight per 100 pieces. Available now. Ask your foundry supply house, or write directly to:

WADSWORTH EQUIPMENT CO. ★

P.O. Box 6122 — Ellet Station — Akron 12, Ohio

For More Information Circle 638, Page 39

Cleaning and polishing small component parts, instruments and control mechanisms.

Breaking edges, shaping to slight radius, touching-up and scores of other operations.

Relieving stress concentration and blending-in to reduce danger of fatigue failure.

PREDICTABILITY—
A Key to Reliability

Advanced technologies demand accurate predictions of performance in tools as well as materials. Predictability in tools used is basic to reliability in products made.

CRATEX RUBBERIZED ABRASIVES can be used with complete confidence. They will perform as expected—engineered for the most delicate and sensitive applications in Deburring, Smoothing, Cleaning and Polishing.

WHEELS, POINTS, BLOCKS, STICKS, CONES	Coarse (C), Medium (M), Fine (F), Extra-Fine (XF)

Sold through leading Industrial Supply Distributors

FREE! send for the new, informative 22 page Cratex Application Manual, including a complete illustrated catalog.

CRATEX
MANUFACTURING COMPANY, INC.

1600 Rollins Road Burlingame, California

For More Information Circle 639, Page 39

CARDOX

CO_2 Technology makes the difference

Carbon dioxide core and mold hardening has had much publicity; but as every experienced foundryman knows, *how* the processes are employed makes the difference. This is why so many foundries look to Cardox CO_2 technology to bring into practical reality the many advantages and economies the processes have to offer. Cardox was one of the first to introduce the CO_2 mold and core hardening process in American foundries, and ranks today as a leading authority.

Cardox foundry specialists are experts in sand formulations and gasing techniques. Their breadth of experience can show you how to produce dimensionally accurate castings at a cost comparable to green sand molding or less. Cardox semi-precision molding techniques save on pattern costs and prolong pattern life. Cardox CO_2 core hardening process produces finished cores right in the core box... no core dryers are needed, no baking is required. Cardox CO_2 mold and core hardening processes can be used with both ferrous and non-ferrous metals, for single unit or automatic high volume production and in any foundry large or small.

Get all the facts today and see the difference Cardox CO_2 technology will make in your operations. Call, write or wire your Cardox foundry specialist now. CARDOX, Division of Chemetron Corporation, 840 N. Michigan Avenue, Chicago 11, Illinois.

CARDOX—Reg. T.M. Chemetron Corporation

CARDOX

Division of CHEMETRON Corporation

Worker sets chaplets on the 5-lb shell core for gray iron burner head casting. Flask size is 21 x 22 in.

CONVERSION TO CASTING . . .

CUTS COSTS 54 PER CENT

By WALLACE D. HUSKONEN
Assistant Editor

● NET SAVINGS of 54 per cent are a good reason for a manufacturing company to switch from a weldment to a casting. It's also the reason that the Heating and Air Conditioning Div., Iron Fireman Mfg. Co., Cleveland, is using a cast gray iron combination gas-oil burner head instead of the welded steel version it used previously.

The original design called for a weldment because Iron Fireman had had difficulty with core shift in previous gray iron castings. The thin sections caused by core shift resulted in hard spots which hindered machining, and the castings often failed to pass tests for pressure tightness.

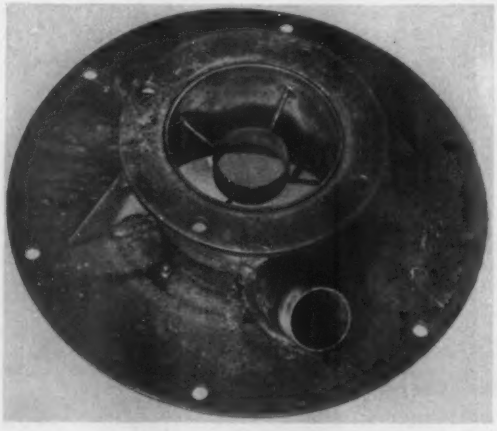
The welded assembly required several pieces of steel stock of various gages to be arc welded manually. Direct labor costs were high, and so were costs in storing and handling. In addition, every weldment had to be pressure tested, a process requiring that every burner jet be plugged. If a welded joint failed to pass the test, it had to be cleaned, rewelded, and then retested.

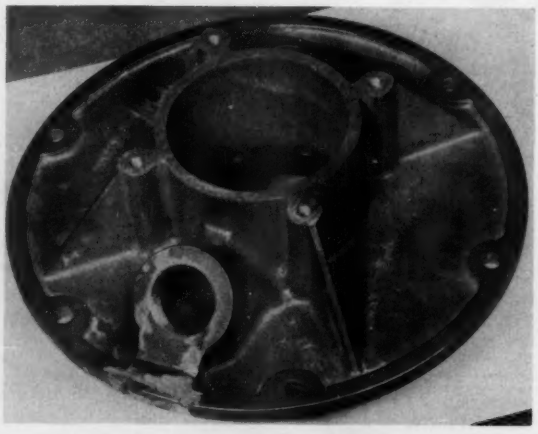
Part Redesigned—In an effort to reduce costs, this manufacturer approached Quality Castings Co., Orrville, Ohio, to make the burner head as a casting. Before the transition could be made, Iron Fireman redesigned the part according to suggestions offered by the foundry. Several experimental castings were made before the design could be finalized.

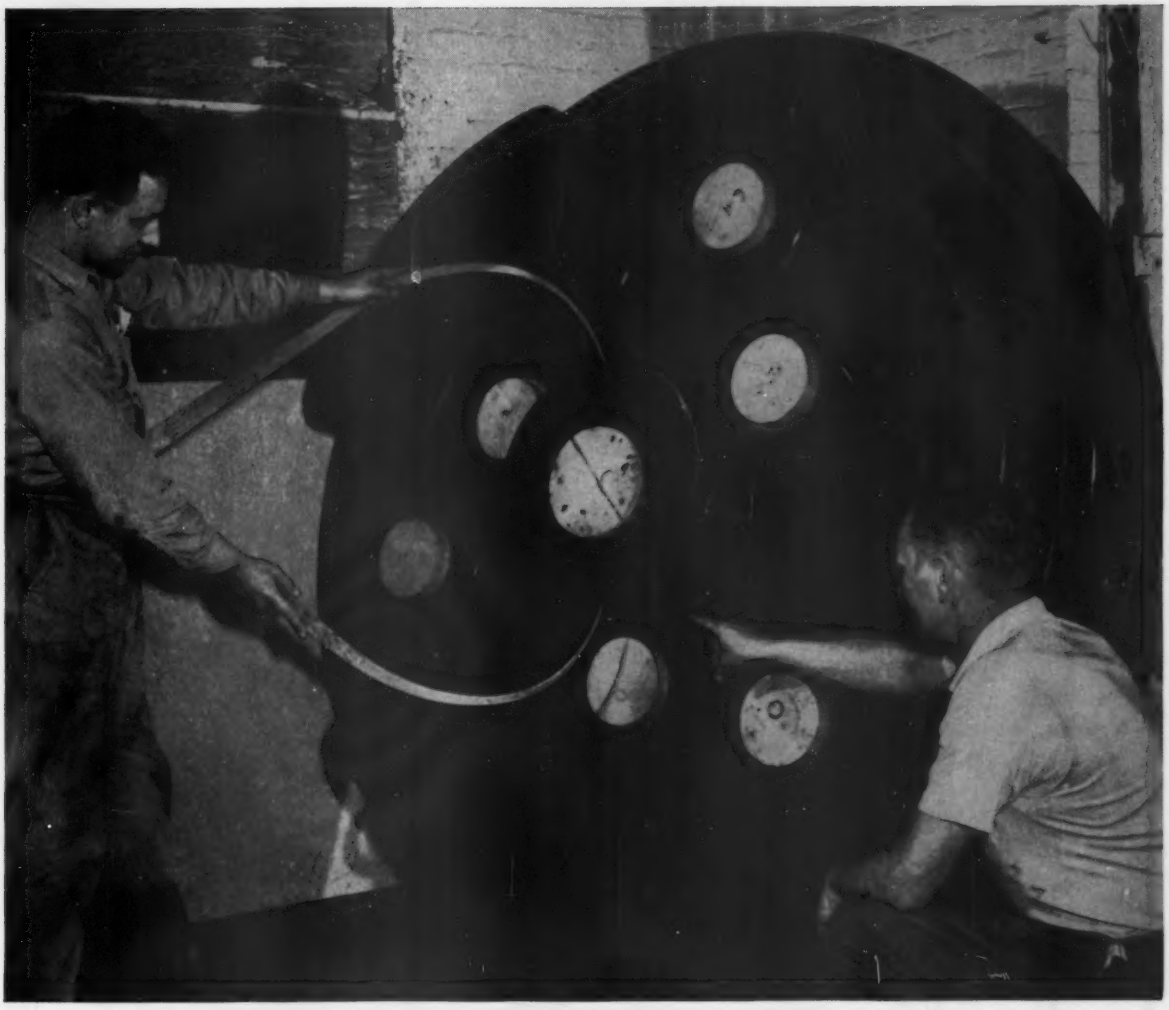
To meet the rigid requirements for the inside of the burner head, it was decided that shell cores would be used. These cores not only produced a good finish, but also made it possible to hold wall thickness consistently within 1/32 in. Machining also was reduced by casting six 5/8-in. diam holes and coring a 2 7/32-in. diam hole for a 2-in. 11½ NPT. The casting is supplied ready for use except for drilling, tapping, and one turning operation.

Because of the good quality these

Costly weldment (left) was replaced by this 65-lb gray iron casting. Conversion to casting solved problems with pressure tightness, reduced cost 54 per cent. Several holes, drilled before, are cast in now







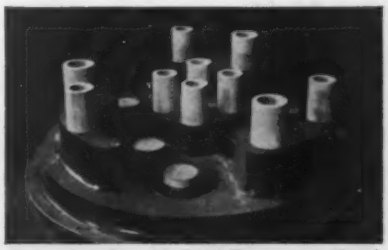
"This intricate mold produced a casting that passed 100% X-ray tests...thanks to J-M Ris-A-Sleev."

Mickey Fratello, Owner,
Castwell Foundry Company, Inc., Middletown, New York

"By keeping the feed metal molten for 30 minutes, J-M Ris-A-Sleev permitted the thin and heavy walls on a 3,600-pound aluminum casting to be cast to an even density. What's more, we were able to save 1,800 pounds of metal because only 125 pounds were needed for the risers. In addition, Ris-A-Sleev saved us a great deal of time by minimizing the amount of metal that had to be cut and ground off the casting.

"We also find Ris-A-Sleev ideal for *magnesium* castings. We used these J-M risers on an intricate 1,200-pound magnesium casting and got perfect results. As a matter of fact, Ris-A-Sleev is the only riser used in our foundry."

For the full J-M Ris-A-Sleev® story, write to J. B. Jobe, Vice President, Johns-Manville, Box 14, New York 16, N. Y. In Canada: Port Credit, Ontario. Cable: Johnmanvil.

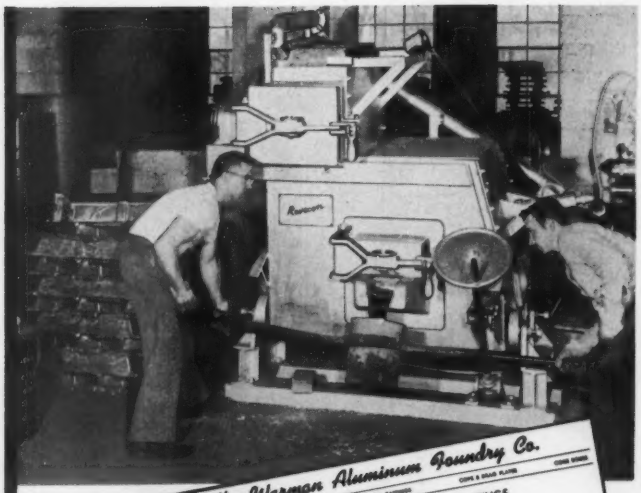


Here you see how J-M Ris-A-Sleev was positioned on this king-size mold to produce a sound casting.

JOHNS-MANVILLE JM

AN INSULATION FOR EVERY COMMERCIAL AND INDUSTRIAL USE

For More Information Circle 641, Page 39



The Warman Aluminum Foundry Co.

ALUMINUM CASTINGS -:- ALUMAL CASTINGS
8618 Center Hill Ave.
Cincinnati 16, Ohio

December 30, 1959

Mr. Rex Harrison
International Foundry Supply
Reading, Penna.

Dear Sir:

I am writing this letter in regards to our conversation a few months ago at which time I promised to send you a statement of my opinion of the Revcon.

I am not in the habit of making snap judgments of people or machinery, therefore I have put the furnace to good use before writing.

The Revcon is everything you said it would be in speed, and above all in quality and quantity. It is possible to get quality metal from the Revcon that I never dreamed could come from a gas fired furnace and at any temperature desired from 1250 degrees F. to 1500 F.

The baffle improved the melt in both speed and gas consumption. Our gas bill is on its way down as we use the Revcon more. We also have decreased our melting loss by using this reverbatory furnace properly.

The more I use the Revcon the harder it is for me to understand how I ever got along without it for the past ten years. It makes crucible melting so old-fashioned as the horse and buggy. I now use one Revcon where I once used three crucible furnaces and get better metal faster.

I can and this rather lengthy [illegible] anything. If there is a foundry that does not have a Revcon, they do not know what they are missing and should look into the subject as soon as possible.

Sincerely yours,

THE WARMAN ALUMINUM FOUNDRY CO.

Chester Brickler
Foundry Foreman

CB:mlb

REVECON FURNACES TECHNICAL REPORT. No. RR 6

Plant THE WARMAN ALUMINUM FOUNDRY COMPANY Cincinnati, Ohio

Visited by Rex Harrison Date Oct 1, 1959 Contact Mr. C B Brickler

Furnace No. G 59081007 Type 520/500 Fuel Natural Gas Ground Condition Good

Approximate Life of Lining at Time of Visit 2 weeks (55 Melts)

Condition of Lining :— Good

Preheat 30 minutes

REPORT ON MELTING TESTS Date Sept 25, and Oct 1, 1959

No	METAL From	Spec	Charged	Time Ready	Poured	Melt. Cu. Ft. / KWH Start	End	Amount	CHARGED Lbs.	POURED Lbs.	LOSS Lbs.	% LOSS	Temp. Pour.
Sept 25	Ingot	356	1:30	1:50	2:25			400	285.00	280.15	2.85	1.0	1250° F
										Vacuum Test	Porosity Tensile		
Oct 1	Ingot	108	8:15	8:35	8:45				300	Good			1350° F
	&	"	8:57	9:15	9:20				300	Good			1300° F
	Returns	"	9:27	9:40	9:45				300	Good			1320° F
Cost to melt:			Melting loss			15 @ $26.40/100 lbs					$ .2640/100		pounds
			Fuel			141 CF @ $.80/1000 CF					.1128	"	"
			Flux			$ $ @ $.22/lb					.1100	"	"
			Refractories			$624.00 for 600,000 lbs					.1040	"	"
			Total								$ .6908	"	"
						COST TO MELT AND POUR					$ .00598		

These heats were re-melted and in great favor with our practice

Witnessed by C. B. Brickler, Foundry Foreman

PROOF OF REVECON Aluminum Melting Superiority

LET US SHOW YOU HOW to enjoy benefits like these in your Foundry! Non-crucible REVECON Furnaces are available in sizes for every foundry need: 50 lb. to 12,000 lb. capacity. REVECON offers the greatest possible flexibility when changing metals. Oil, gas or coke fired.

WRITE TODAY requesting our informative 20-page Brochure!

INTERNATIONAL FOUNDRY SUPPLY CO.
P. O. Box 1053, Reading, Pa. (FR 6-0794)
Canadian Representative: DREW BROWN LTD., 5410 Ferrier St., Montreal 9

castings have shown, the 100 per cent pressure testing has been found to be unnecessary. Now, each casting is given a close visual inspection and only 10 per cent are pressure tested. Savings on inspection plus reduction of number of operations at Iron Fireman from 57 for the weldments to seven for the castings add up to yield the 54 per cent savings. These castings have been used in production for about one year, and the savings to date have been more than sufficient to pay off the cost of the pattern equipment.

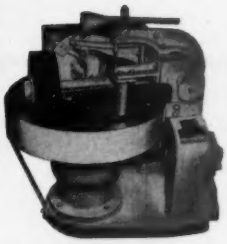
Green Sand Mold—The casting weighs about 65 lb and is made in a green sand mold. Flask for the mold is 21 by 22 in. with a 9-in. drag and a 6-in. cope. Cold-coated sand with 4 per cent resin is used for the shell cores, one of which weighs 5 lb and the other 3 oz. The baking cycle is 1.5 min at 500° F.

Quality Castings employs about 200 and, in addition to gray iron castings, produces magnesium castings and a growing amount of ductile iron castings, all on a production basis. An indication of the foundry's concern for quality is the fact that its laboratory features a direct-reading spectrometer which is used to check all heats for both iron and magnesium castings.

By co-operating with the customer to cast a problem component, this foundry is casting what used to be a weldment on a regular production basis. In addition, the satisfactory results which have been achieved may lead to the casting of other, similar burner components in the future.

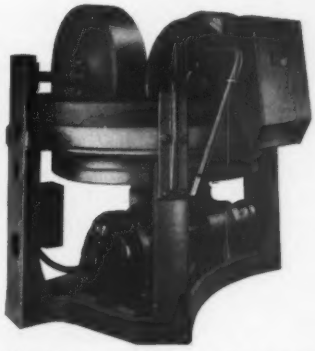
Plant Engineering-Maintenance Show Is In Greensboro, N. C.

Plant engineering and maintenance equipment will be shown under simulated operating conditions at the third Southeastern Plant Engineering and Maintenance Show, to be held in War Memorial Coliseum, Greensboro, N. C., Sept. 12-14. Concurrently, the third Southeastern Seminar at the adjoining Town Hall will feature talks by engineering executives and group discussion of actual plant and building engineering and maintenance problems. Area chapters of the American Institute of Plant Engineers will sponsor the seminar.

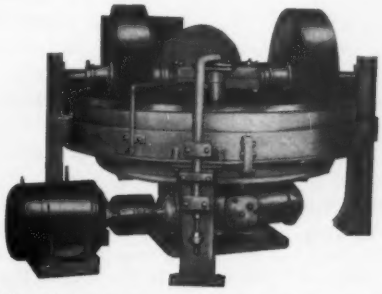


No. 251 2½-ft. diameter
....½ to 1 cu. ft. batch

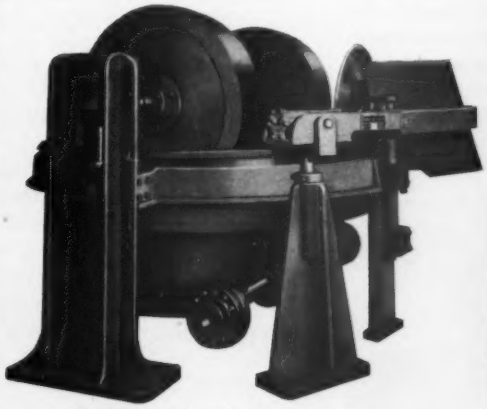
No. 414 4-ft. diameter
.....2 to 4 cu. ft. batch



No. 610 6-ft. diameter....10 to 14 cu. ft. batch



No. 715 7-ft. diameter....15 to 20 cu. ft. batch



No. 930 9-ft. diameter....30 to 40 cu. ft. batch

ANY SIZE MADE TO YOUR SPECIFICATIONS

From compact portables to heavy-duty mullers

CLEARFIELD CAN SUPPLY THE RIGHT MIXER FOR YOUR JOB

Clearfield Mixers are available in capacities ranging from ½ to 40 cu. ft. . . . for batch or continuous mixing. They're constructed of rugged cast iron for strength, rigidity and wear resistance. And all Clearfield mixers feature the "revolving pan" mixing principle which keeps the material in *constant* state of violent motion; this eliminates the "lag" intervals which result in mixers with mullers and scrapers that revolve instead of the pan. With Clearfield revolving-pan mixers you get a constant controlled-course mixing action which assures a better balance of blending and tempering.

Whether you need a mixer for maintaining proper bond and moisture in heap sands . . . preparing facing sand or core sand for castings . . . or for any foundry application where sand control is important . . . Clearfield Mixers can do the job better, and save you production money.

Let us help you determine the best type and size for your particular needs. No obligation. Meanwhile, send for Catalog No. 90.

CLEARFIELD
MACHINE COMPANY
CLEARFIELD,
PENNSYLVANIA, U.S.A.

Pickup in Casting Orders Gains Momentum

Casting Orders Exceed Capacity

PITTSBURGH—If steelmaking operations pick up in September as expected, Pittsburgh foundries are sure to benefit. Mill inventories of castings used for maintenance and repairs are at a minimum, and any uptrend in consumption will be reflected immediately in new orders.

Demand for rolling mill rolls is rising now. The relatively high level of steelmaking operations in May and June depleted mill inventories, forcing many companies to reorder. One roll producer told FOUNDRY that its June shipments exceeded capacity (because of holdovers from May) and were the largest of any month since February, 1960. New orders taken in June surpassed capacity, and July bookings dipped only slightly.

"Our August shipments won't quite equal July's, but they'll be good," a sales official commented. "We expect our shipping rate in September to be at least 80 per cent of capacity," he continued, "and we believe our second half shipments will be 25 to 30 per cent higher than those of second half, 1960. If we're forecasting accurately, we'll more than make up for falling 24 per cent behind our 1960 pace in the first half."

Confirming the renewed interest in rolls, another producer predicts that its August shipments will be at least 20 per cent higher than July's. Barring a strike in the automotive industry, September shipments should be on a par with August's.

At steel and gray iron jobbing foundries, there's less optimism. Producers are disappointed that the upturn in steelmaking hasn't triggered greater demand for castings. Although most buyers have ended vacations, they haven't stepped up purchases. They're keeping inventories at a minimum and pressing suppliers for fast service. Result: Ferrous foundries have no backlogs and are operating only two or three days a week.

But all is not black, even for jobbing foundries. A leading producer of nonferrous castings reports good sales. Says the owner: "We're running five days a week at about 90 per cent of capacity, and we're set for a month and a half. The machinery builders aren't buying much, but they've got a lot of work on their drawing boards that's waiting to be released. We figure that August will be a little better for us than July, and we're optimistic about the fall.

Uptrend Shows in the East

PHILADELPHIA — Casting demand edged up in August, and with vacations now over, a further acceleration in September is expected.

Not only will consumption be stimulated by more favorable seasonal influences, but buying likely will be increased by a stock buildup at various consuming plants where inventories have become well depleted.

Government spending, as now proposed (including defense as well as various other programs) is not likely to have immediate direct effect, but may, through its inflationary implications, quicken buying in other directions.

Gray iron production is estimated at slightly in excess of 60 per cent of normal. Auto die work is looking up and power transmission and material handling equipment needs are more active. Construction castings are moving well, although there is relatively little weight in this type of work. Specifications from manufacturers of papermaking, textile and tobacco processing machinery are slow. Most gray iron shops can still promise deliveries within one to two weeks.

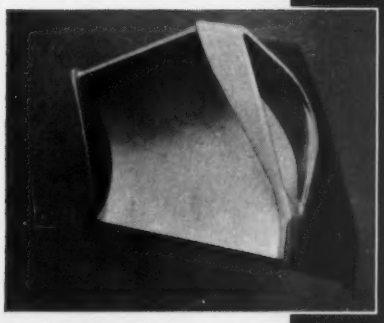
Steel casting deliveries average around three weeks, indicating a continued spotty situation. Oil refinery needs are lacking, although ship yard requirements have stepped up a little. Prospects for heavy industrial equipment business are brighter, but there has been no major upswing.

Production at malleable job shops has increased. Some estimate the average at 65 to 70 per cent of normal, with more business appearing in building and marine hardware and in pipe fittings. One leading job shop now is quoting four to six weeks' delivery, compared with two to three weeks a month ago.

Most brass and bronze shops are operating three to four days a week. Manufacturers of industrial valves and pumps report business is fairly good, and manufacturers of meters report an uptrend. There is a continued lag in the plumbing lines, however, and although ship work is up a little, it is still far from

GIRI OPERATORS' MEETING: Gray Iron Research Institute Operators' meeting, held recently in Columbus, Ohio, featured reports from various technical committees and a visit to James B. Clow & Sons Inc., Coshocton, Ohio

Made to deflect tornadoes at white heat . . .



Casting of nozzle guide vane for turbo-jet engine

Radiograph shows casting sound and up to its job

Nozzle guide vanes in turbo-jet engines must withstand fiery blasts — dependably. Austenal Company, division of Howe Sound Company, checks the soundness of each cast vane with radiography

Cobalt base or nickel base high-temperature alloys are required in order to withstand these terrific temperatures. Investment castings are specified because of the alloys that must be used and because the vanes would be almost impossible to forge, machine, or otherwise fabricate, at the cost level of investment castings.

Austenal Company, division of Howe Sound Company, casts these blades by the "lost wax" method. Each one is then radiographed to make sure that no hidden flaw lurks within that could cause failure.

Makers of quality castings, small and large, find radiography invaluable in making sure that only high-quality work is delivered. It is a way reputations are built and new business won.

Radiography can work for you, too. To find out how, talk it over with an x-ray dealer or write us for a Kodak X-ray Technical Representative to call.

New . . . Ready Pack in ROLLS and SHEETS.
Kodak Industrial X-Ray Film, Types AA and M, in 200-ft. rolls (16mm, 35mm, 70mm) and sheets (8 x 10, 10 x 12, 11 x 14, 14 x 17).

- No darkroom loading—film sealed in a light-tight envelope.
- Just place Ready Pack in position and expose.
- Film protected from dust, dirt, light and moisture.
- In the darkroom—remove film from envelope and process.

Kodak
TRADE MARK

EASTMAN KODAK COMPANY
X-ray Sales Division • Rochester 4, N.Y.

For More Information Circle 644, Page 39

ACCURACY + PORTABILITY + ECONOMY

precision measurements

Take it anywhere

Cuts costs

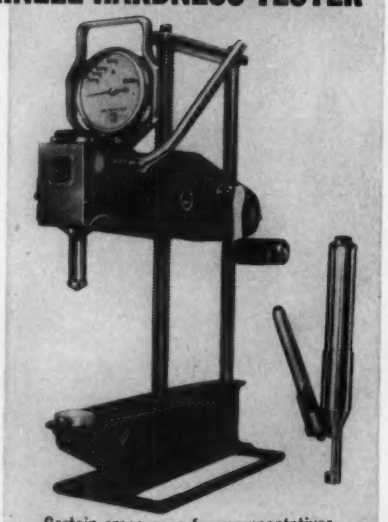
THE KING PORTABLE BRINELL HARDNESS TESTER

DELIVERS ALL THREE FOR UNLIMITED USES!

Precise quality control — the most important function of any hardness test, is one of the many reasons users depend on the King Portable! Together with the King Brinell Scope, the King Portable provides quick readings on almost any size or shape of metal in practically any location!

Economical too, because one test head can be used in many inexpensive adapters.

Get complete information now by writing for literature, prices and a demonstration.

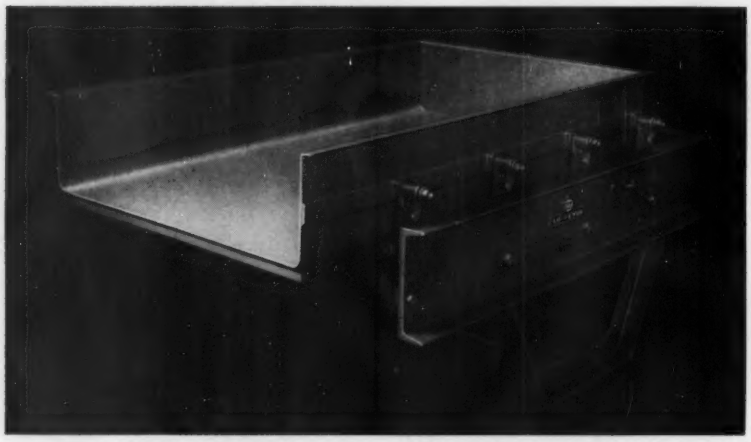


KING TESTER CORP.
444 N. 13TH STREET
PHILADELPHIA 23, PA.

Known the world over for accuracy and dependability • Representatives in principal cities

Certain areas open for representatives

For More Information Circle 645, Page 39



Save Space, Installation and Maintenance Costs with

AJAX VIBRATING FEEDERS

Designed for short carries between machines, conveyors and processes, Ajax Vibrating Feeders combine mechanical simplicity, absence of complicated electrical systems and low cost. They are easy to install as part of a material handling system. They can be designed into complete processing units. 3′ to 10′ lengths, widths from 6″ to 36″. *Write for information.*

AJAX

Incorporated 1920

Conveyor Division

AJAX FLEXIBLE COUPLING CO. INC.
204 Portage Road Westfield, N.Y.

Representatives in Principal Cities

brisk. Captive shops on an average are doing a little better than the independent shops.

Most of the area aluminum jobbing foundries are operating at close to five days a week but they have to scratch for tonnage and have small backlogs.

The New Brunswick Iron Works Inc., New Brunswick, N. J., has discontinued business and is liquidating its assets. The company was formed in 1872 and was incorporated in 1909.

Midwest Is Foundry Center

CHICAGO—The five-state area which includes Illinois, Indiana, Iowa, Minnesota, and Wisconsin has about one-fifth of all U. S. foundries, the new edition of *Penton's Foundry List* discloses.

Currently the area has 19.9 per cent of the country's gray iron foundries, 29.5 of malleable, 17.8 of steel, 15.9 of brass and bronze, 19.6 of aluminum, 14.3 of magnesium, and 19.8 per cent of zinc. The five states now have 18.7 per cent of the nation's ductile iron producers, 21.7 per cent of the shell molders, and 12.9 per cent of the investment casters.

The area embraces 19.6 per cent of the jobbing foundries of the U. S. and 20.3 per cent of the captive shops.

* * *

Foundrymen are not likely to be enthusiastic about a recently introduced gas turbine-driven farm and utility tractor. Not yet commercially available, it eliminates a lot of castings as compared with the orthodox piston-engined type.

Announced by International Harvester Co. in July and called the HT-340, the new machine pairs the gas turbine engine with a hydrostatic transmission. An 80-hp, single-shaft type, the turbine is a product of Solar Aircraft Co., a Harvester subsidiary. A midget beside the 450-lb, 40-hp piston engine formerly paired with the hydrostatic transmission, it is 21 in. long, less than 13 in. in diameter, and weighs only 90 lb with reduction gearing.

Much research must yet be completed with heat-resistant materials and precise production methods, however, before the gas turbine can become a competitive, commercial power source for a farm tractor.

For More Information Circle 646, Page 39

IMPROVE LADLING OPERATIONS SIX WAYS WITH KAISER HELSPOT PLASTIC GRAPHITE-BASE LADLE LINING

The unusual combination of silky-smooth graphite and super-duty refractory ingredients results in Kaiser Helspot, one of today's finest ladle lining materials.

Kaiser Helspot Plastic makes metal-melting and pouring operations run more smoothly six different ways:

1 ABSENCE OF INCLUSIONS. Helspot minimizes metal contamination, insures cleaner metal . . . provides a way to avoid bits of inclusion material that affect casting quality and cause rejections.

2 LUBRICATED SURFACE. Helspot is non-wetting. Molten metal flows as freely over the Helspot surface as water flows off a duck's back, without penetrating or sticking.

3 EASY SLAG REMOVAL. Clean metal can only be poured from a clean ladle. Helspot successfully resists attack of molten slag and reduces skull adhesion.

4 RESISTS THERMAL SHOCK. The Missouri Super-Duty Fire Clay base—plus blended graphite—produces in Helspot an unusually high resistance to spalling.

5 ECONOMY. Use of Helspot results in longer service life, lower refractory maintenance, more pours of perfect castings, fewer rejections . . . more production at less cost.

6 HIGH FUSION. Helspot chemical components added to Super-Duty Fire Clays make ideal linings to combat temperatures encountered in metallurgical operations.

Ask your Kaiser Refractories Sales Engineer about the other advantages of using Helspot Plastic or Helspot Brick for wells, spouts, runners—wherever you want smoother flow of molten metal and minimum slag buildup.

Call or write Kaiser Refractories, Kaiser Aluminum & Chemical Sales, Inc., at any of the offices listed below:

PITTSBURGH 22, PA. . . . 3 Gateway Center
MEXICO, MISSOURI . . . Mex-R-Co Building
OAKLAND 12, CALIF. . . . 300 Lakeside Drive

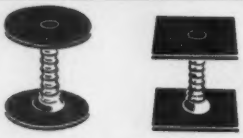
(Canadian Subsidiary:
Refractories Engineering & Supplies, Ltd.)

KAISER REFRACTORIES

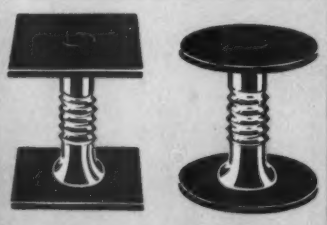
For More Information Circle 647, Page 39

Choose CLEVELAND CHAPLETS for Casting Consistency!

Cleveland Radiator Chaplets — include both popular open flat coil head and regular plate heads ... in all styles and finishes.



Motor Chaplets—made with annular fusion rings for uniform knitting and maximum core support; also with wide radius shoulders that eliminate gas-collecting voids under the heads.



Double-Head Chaplets — used for heavier metal sections, these chaplets are accurately made of low carbon steel and carefully tinned. Also produced in heavy and extra-heavy sizes.

Square Super Chills and Regular Curved Chills—accurately equalize cooling rates of thick and thin casting sections ... eliminate shrinks. Complete line ... black, copper or tin coating.

For chaplet detail, write today for Cleveland's up-to-date catalog.

Cleveland Since 1890

CHAPLET & MFG. CO.

Division of F. Hohlfelder Co.

26470 Lakeland Blvd. • Cleveland 32, Ohio

For More Information Circle 648, Page 39

Black and white reproduction of first advertisement in SFSA campaign

Steel Founders' Society

Launches Advertising Program

● THE Steel Founders' Society of America this month launches a publication advertising campaign featuring the benefits of steel castings.

Coinciding with the centennial observance of the steel casting industry in the United States, the new campaign marks a dramatic re-entry into business magazine advertising after an absence of several years. The Society's promotional efforts in recent years have been largely of a direct mail nature based on a series of product design studies.

The first of the two-page, two-color advertisements will appear in the Sept. 14 issue of MACHINE DESIGN and the Sept. 25 issue of STEEL.

James A Sweeney, chairman of the SFSA Advertising and Public Relations Committee, and advertising manager of the National Castings Co., Cleveland, said that "for some time, Society members have felt that a publication program is essential to promote the advantages of steel castings to the constantly-increasing number of buying influences.

Headlined "Design With Steel Castings For . . . ," the new series will present by photo illustration and copy specific end-use benefits of steel castings. For instance, the first ad in the series (shown here) urges specifiers of components to design with steel castings "for metallurgical versatility."

The copy reads:

"Only when you *cast* steel can you capitalize on the limitless possibilities of the world's most versatile metal.

"Steel castings can take jarring abuse and grinding abrasion, searing heat and glacial cold, thermal shock and corrosive attack.

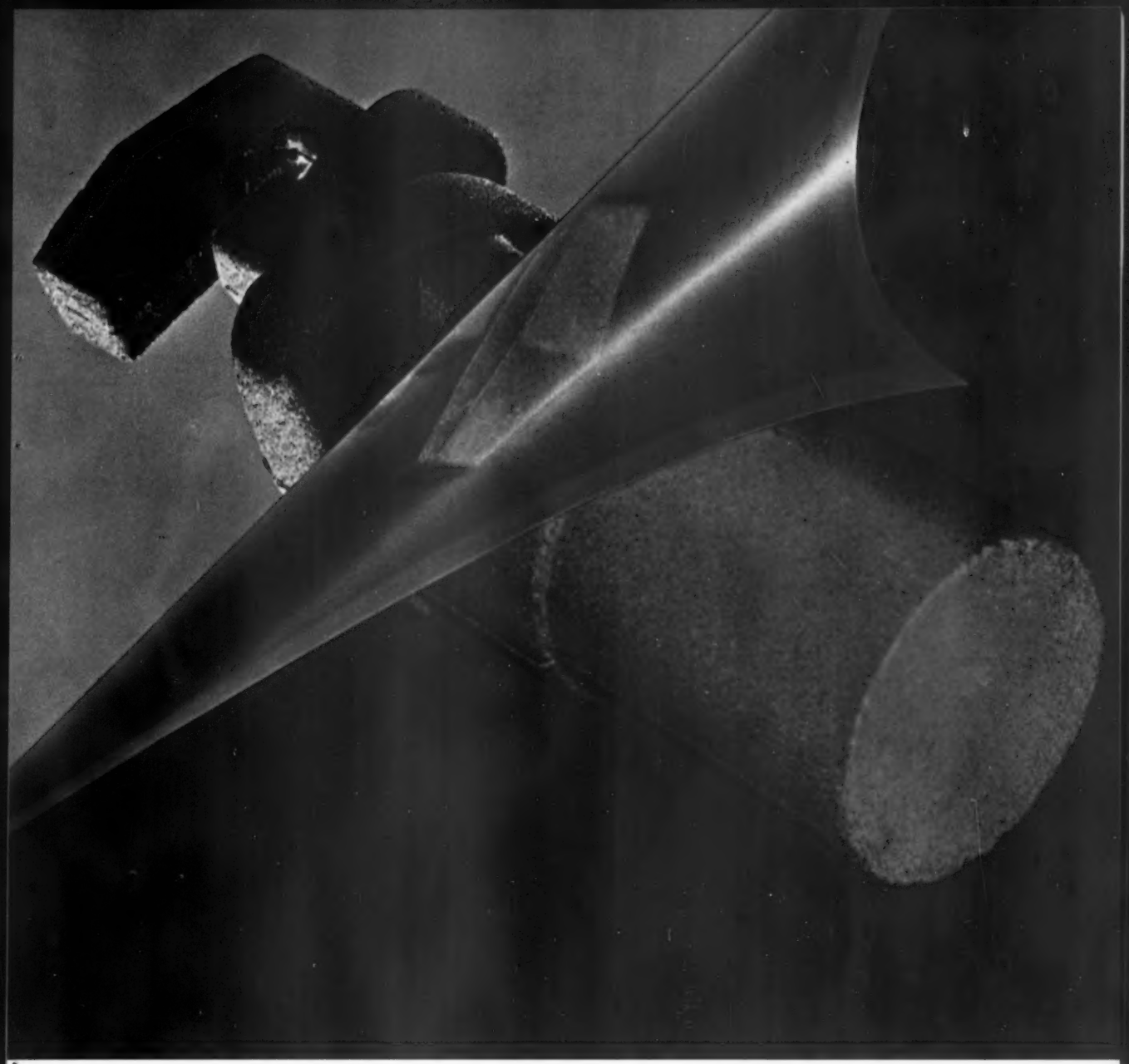
"Casting with steel offers the designer the sure path to follow in making components that withstand punishing service conditions. It is the most economical, most direct way of utilizing steel's inherent strength, toughness, dependability.

"Consult your steel foundryman. Discover how you can obtain the steel you want, in the shape and exact alloy you need . . .with optimum economy, strength and design freedom."

Each advertisement in the series will list nine other advantages of steel castings. A coupon will urge readers to write for more literature.

A series of mailings with the advertisements contained within "covers" of the two magazines will be made at regular intervals and quantity reprints of the ads will be available to members at cost.

Circle 649, Page 39→



Save baking time, mold the best quality cores—use...

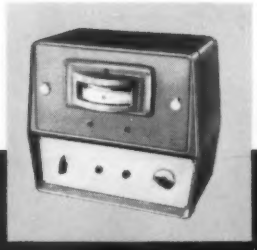
DEXOCOR®
and MOGUL®
binders

WRITE OR PHONE

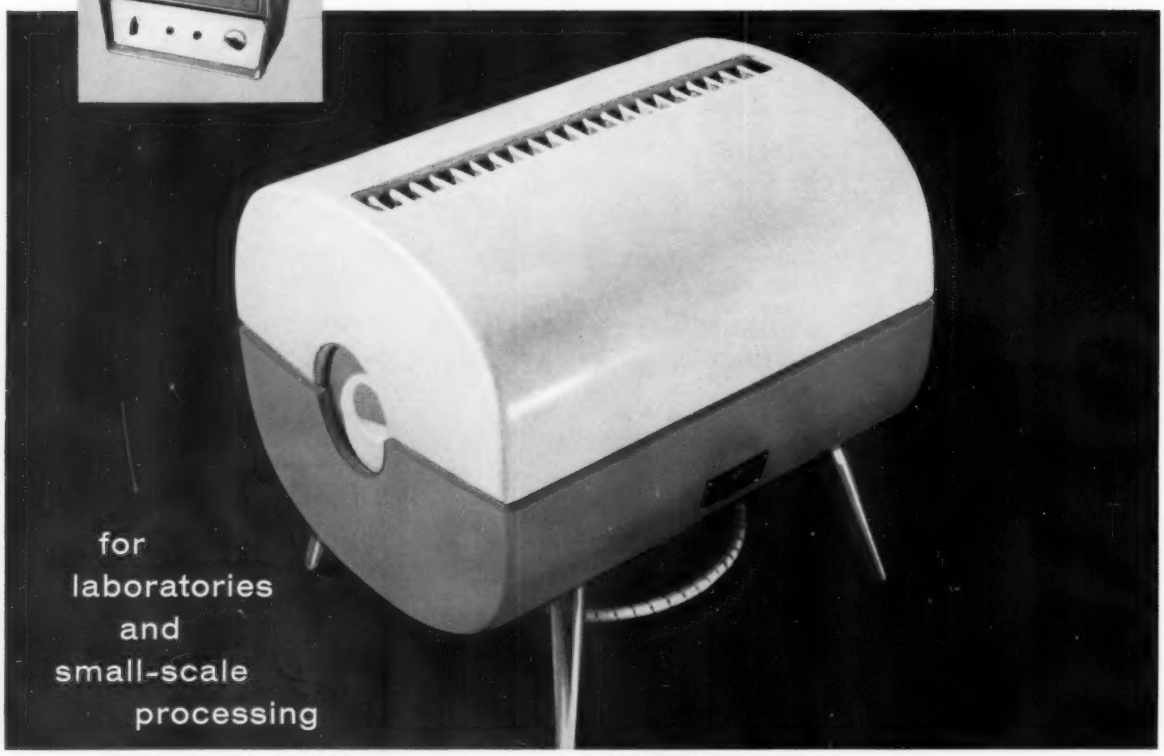
Corn Products for expert technical assistance... helpful data on these fine products for Foundrymen:

DEXOCOR® • MOGUL® • KORDEK® • HYDRACOR® binders • GLOBE® dextrines.

CORN PRODUCTS COMPANY INDUSTRIAL DIVISION • 10 East 56 Street, New York 22, N. Y.



JMC type C8 control unit pulses power input to furnace, indicates temperature and provides fail-safe over-temperature protection.



UNIFORM TEMPERATURES TO 2730° F

Rugged as they are attractive, the new JMC Model K High Temperature Furnaces are real performers too:

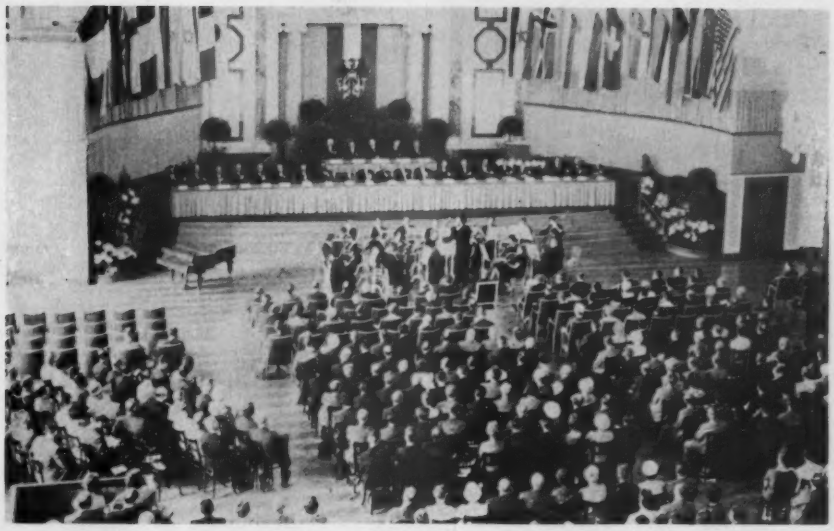
- Platinum wound for lowest operating costs
- Windings totally embedded in high purity alumina
- Hot zone of uniform temperature
- Elements easily replaced, even on hot furnace
- Minimum heat loss . . . may be operated on unprotected work bench
- Two integral thermocouples, embedded in refractory
- Variety of general purpose models, with combustion chambers up to 21½ in. long by 2½ in. dia.
- Ash Fusion and Controlled Atmosphere model with sighting window and bursting disc
- Thermocouple Calibration model for temperature up to 3225° F

Model K furnaces are the result of Johnson Matthey's unsurpassed experience in platinum-wound furnace design and manufacture.

For complete information, send for Technical Data Sheets.

Johnson Matthey

JOHNSON, MATTHEY & COMPANY, INC. • 608 Fifth Avenue, New York 20, New York • Telephone Circle 5-6790



View shows opening ceremony at the congress. The 22 international delegates are seated on the stage and international committee officers behind them

I. SANS DARNIS
President
International Committee

R. DOAT
Vice president
International Committee

World Foundrymen Meet at

International Foundry Congress

By M. M. HALLETT
Managing Director
Chamberlin & Hill Ltd., Walsall, England
European Editor, Foundry

● THE 1961 International Foundry Congress, held in Vienna, Austria, June 19-24, was favored by a setting among magnificent buildings of the old Austrian Empire, brilliant weather, and the charm of the Austrian hosts.

This international congress was the first to be opened by a head of state. In his opening speech, A. Scharf, president of the Austrian republic, referred to the fact that Austrian industry had been destroyed almost totally during the war. With the help of foreign aid, however, particularly from the USA, present production of iron and steel castings is approximately four times what it was in 1937.

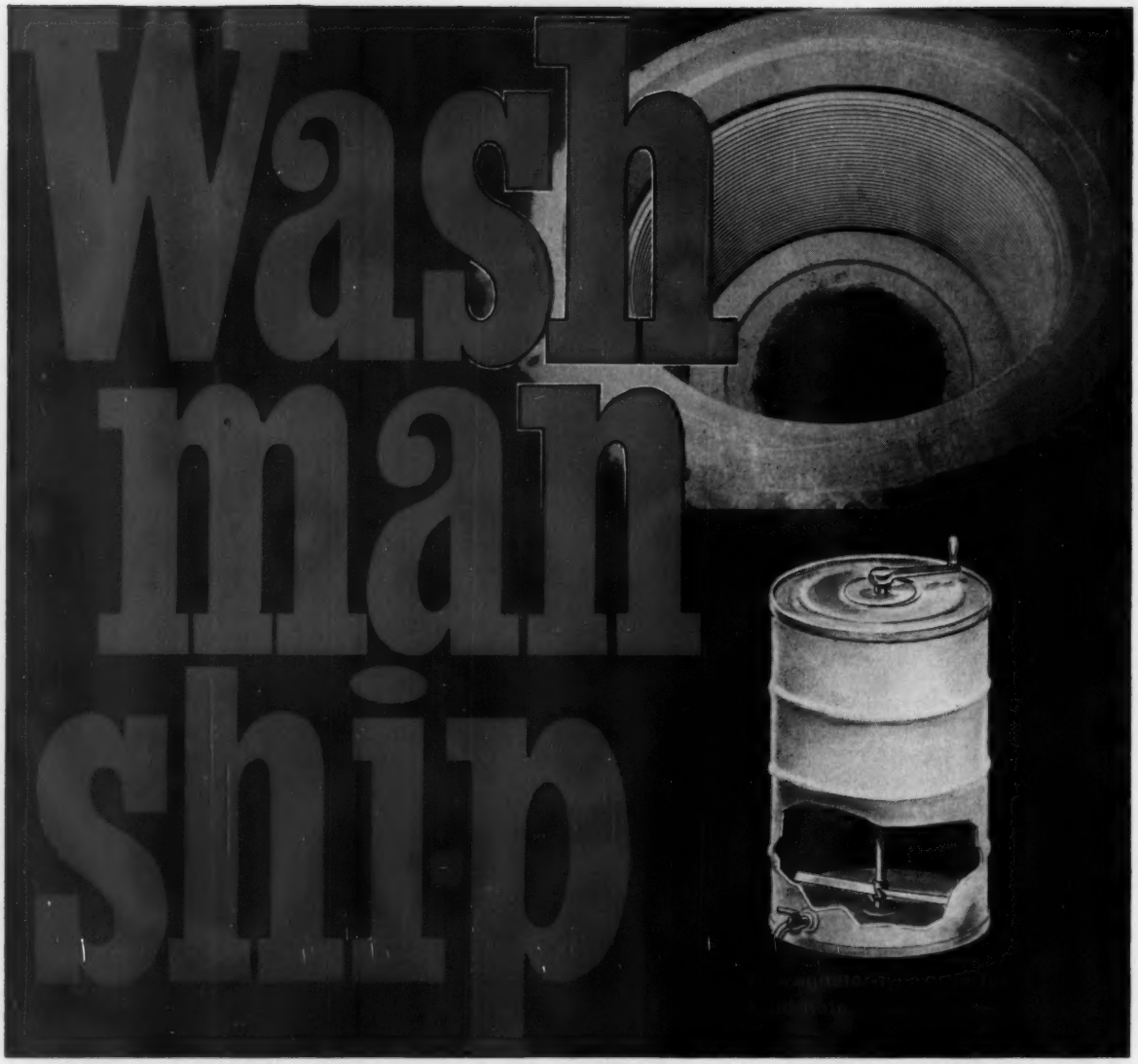
While the delegates worked, the ladies were able to attend a large number of interesting functions. A feature of the annual banquet was a parade of waiters, garbed in safety equipment and wheeling seeming ladles of molten iron which spouted sparks over the assembly. Cupolas that tapped coffee and convertors that delivered champagne added to the atmosphere.

The meeting opened with a welcome from the president of the International Committee of Foundry Technical Associations, I. Sans Darnis, of Spain, who paid tribute to the services of the late L. N. Shannon.

The committee on the international foundry dictionary reported that the dictionary should appear early in 1962. The committee on methods of testing cast iron announced that full committee reports on an extended classification of graphite in gray cast iron and methods of impact testing of gray cast iron also would be submitted to the Detroit meeting in 1962.

Another report was promised for Detroit by the committee on testing of materials used in the CO_2 process. Committees on malleable cast iron, foundry clays, foundry coke, and founding properties of metals also reported steady progress.

Consideration was given to proposals from France for altering the rules of the International Committee. In view of the importance and complexity of the subject it was decided to remit this matter to a subcommittee consisting of the nine founder nations. After discussion, the following program of future foundry congresses was agreed on: 1962, Detroit, USA; 1963, Prague, Czechoslovakia; 1964, Amsterdam,



WASHMANSHIP—Let a Smith Engineer prove we can reduce wash costs/improve casting quality

Washmanship—at G. E. Smith, the art of recommending the correct wash for any application, then following up with detailed technical service. With a complete range of washes from which to select, the Smith man can service any wash requirement—conventional, cold-setting or no-baking! **Kold-Set Type Z**—high-zircon refractory, powdered form for steel, iron and nonferrous (with graphite added, Type G) . . . **Kold-Kote**—lite-off types for steel, iron and nonferrous; furnished pre-mixed with alcohol in new agitator-type drums (you need only attach spigot for same handling of alcohol materials) . . . **New Black Satin**—low-price, powdered, high-graphite refractory core and mold wash (you mix with water only).

FREE SAMPLE OFFER, any Wash type you wish. **CIRCLE NUMBER** shown below on Reader Service Card. **WRITE OR PHONE COLLECT** for sample or to discuss wash problems.

G. E. SMITH, INC.

FOUR WEST MANILLA AVENUE • PITTSBURGH 20, PA.

Warehouse Stocks in Boston • Chicago • Philadelphia • Detroit • Indianapolis
San Gabriel, Calif. • Hamilton • Toronto • Montreal

DISTRIBUTORS: Core-Lube, Inc., Danville, Ill.; Kleist-Farris Co., Inc., Boston, Mass.; Sierra Foundry & Supply Co., San Gabriel, Calif.; George F. Pettinos (Canada) Limited, Hamilton, Ontario.

LICENSEES: Gebr. Huttens KG., Dusseldorf, Germany; Vereingte Chemiche Fabriken—Kreidl, Reuter & Company, Vienna, Austria.

Officials arriving at the congress include, left to right, starting second from left, I. Sans Darnis, president, International Committee; A. Scharf, president, Republic of Austria; J. Drammel, chairman, organizing committee; and F. Sigut, secretary, organizing committee. The other two persons are attendants

Holland; 1965, Warsaw, Poland; 1966, India.

R. Doat of Belgium was elected president of the International Committee for 1962, and the vice presidency was offered to Switzerland, which country undertook to provide a definite answer within two months. M. Vuilleumier and P. W. Muller (Switzerland) were re-elected honorary treasurer and secretary respectively.

Phosphorus in Steel — J. Czikel (Austria), in the official guest lecture, described work on the embrittling effect of phosphorus on cast steel and methods of reducing the effect. Raising the phosphorus from 0.04 to 0.15 per cent in 60-cycle induction furnace steel keel test blocks reduced the impact value by about 60 per cent.

In commercial Bessemer steels, the effect of phosphorus was found to be more severe as sulfur and carbon contents rose. Embrittlement was due to segregation in the original cast structure. Segregation could be reduced by annealing, by refining the grain, or by combining phosphorus with other elements.

The least effective method was the first since it required treatments for long times at high temperatures which led to excessive grain growth. The second method could be applied when the steel was in metal molds. Grain size was so much finer and diffusion distances consequently so much shorter that effective annealing could be performed at reasonable times and temperatures. The third method involved additions of cerium and magnesium alone or in combination. Results showed that with an addition of 0.24 per cent CeMg, the impact value of a cast steel was increased by more than five times following annealing for only 15 min at 1560° F or about eight times after 105 min at 1650° F.

Ultrasonic Testing of Steel—A paper by A. H. Sully and J. D. Lavender (U.K.) covered the ultrasonic detection of defects in steel. The experimental work, carried out on test blocks, was designed to show the effects of factors occurring in everyday practice in the foundry. The condition of heat treatment did not influence the results, and differences between a fine, equiaxed primary structure and a coarse columnar structure were insignificant.

Both hand grinding and rough machining reduced variations due to surface conditions. With smooth surfaces, the normal surface-probe technique was more sensitive, but the water-immersion technique was applicable to a wider range of surfaces. With synthetic defects consisting of drilled holes, the surface-probe technique on a smooth surface could detect a hole 1.5 mm in diam 115 mm below the surface.

The inconvenience of immersing large castings in water led to work on the use of a coupling jet of water which is still in progress. Promising results have been confirmed by examination of many castings in the foundry.

Directional Solidification in Steel—Attainment of controlled directional solidification in 100-ton steel castings was described by P. Tavolotti and G. Iaccarino (Italy). Formerly, yield was less than 50 per cent since six large feeding heads were used. By inserting water cooling coils in remote sections of the mold and extracting heat, the yield was increased to 80 per cent with only one feeding head. To calculate the location of the coils and the amount of heat to be extracted, the castings were divided into six regions, and simplified laws of heat flow were applied. Soundness of the castings was confirmed by ultrasonic inspection.

Slab Ingot Molds — A statistical survey of the performance of slab ingot molds based on a production of nearly 3000 tons per month was presented by A. Czech (Austria). This showed that within the limits studied, the closer the shape approached a cube, the better the life was, provided that the mold was well tapered. The bad effects of hot steel and high frequency of use with short pauses between heats were evident. Ingot mold production factors seemed to be significant only in connection with burn-on defects. Differential expansion of ingot molds with consequent stress formation and distortion also was studied.

LD Process—The LD process of steelmaking for the foundry was described by R. Rinesch, H. Neudecker and J. Eibl (Austria). The process involves blowing pure oxygen through a watercooled nozzle onto the surface of molten iron in a basic-lined convertor. During a

"SPEER KOSTKUTTER* RODS Result In Substantial Savings Over Conventional Cutting Carbons"

—says Ted Gibson, cleaning room superintendent, West Michigan Steel Foundry, Muskegon, Mich.

"Their interlocking feature eliminates the loss of 2½" stubs and the need for special steel sleeves to form conventional cutting carbons. Speer rods also enable us to remove more waste metal for every dollar spent on carbons. And that's not all...

"Speer shows an enlightened attitude toward their customers' needs, as exemplified by the fact that they have been the *first* to come up with improvements to help us with our metal-removing procedures and lower our manufacturing costs. In addition, Speer's *direct* methods of sales and service save us the middleman's markup."

Reasons like these are why more and more foundries are switching to Speer Kostkutter Rods for their cutting carbon needs. They like the convenience and the way the rods' interlocking feature virtually eliminates stub waste and keeps heat away from the clamp for longer torch life.

Only Speer makes genuine Kostkutter Rods. Get them in diameters of ½", ⅝", ¾" and 1".

*Patent applied for

SPEER Carbon Co.
Carbon Products Division • St. Marys, Pa.

20-min blow, the carbon is reduced from 4 to 0.1 per cent, silicon from 1.2 per cent to nil, manganese from 1.8 to about 0.5 per cent (depending on slag condition), phosphorus from 0.16 to 0.025 per cent, and sulfur from about 0.04 to 0.02 per cent (eliminated mainly as SO_2).

The final steel is very low in nitrogen and hydrogen and normal in oxygen with excellent mechanical properties and freedom from brittleness. The proportions of pig and scrap are changed to suit demands. Steel for light castings is blown from a charge with about 2.75 per cent carbon and 1.8 per cent silicon; that for large castings is blown from a charge with about 4 per cent carbon and 0.75 per cent silicon. Convertors of 90-ton capacity are in regular use, and 250-ton convertors are planned. The process requires low capital investment and maintenance costs, but the yield from the metallic charge is only 88-90 per cent. Examples were given of a wide range of castings weighing 1 lb to 45 tons.

Pouring Steel in Green Sand Molds—Some theoretical studies of the longest permissible pouring times for steel cast in green sand molds were reported by K. Hess (Poland). The flow of molten metal into a mold is controlled by the ratio of the heat content of the metal to the rate of heat abstraction by the mold. A formula for time to fill the mold was derived first and from this a formula giving maximum allowable mold filling time was achieved.

This formula was confirmed by experiments with steel with 0.15-0.5 per cent carbon in different thicknesses at different pouring temperatures. This work led to a further relationship between maximum pouring time and the required accuracy of the casting. All these factors, including maximum pouring time, temperature, fluidity, and accuracy, were combined in a nomograph.

Desulfurization of Carbon Steel—The American exchange paper was presented by A. J. Kiesler, General Electric Co., who described work on the desulfurization of carbon steel to extra-low limits in the basic electric furnace. The process involved desulfurization using a high lime slag before removal of carbon, instead of the usual order of oxidation and then desulfurization.

It resulted in sulfur contents of as low as 0.003 per cent in steels with low hydrogen and nitrogen contents and with low impact transition temperatures. A magnesite hearth is essential even though magnesia is a much weaker desulfurizer than lime. During a brisk discussion, comparisons were made with similar work done in England and Belgium.

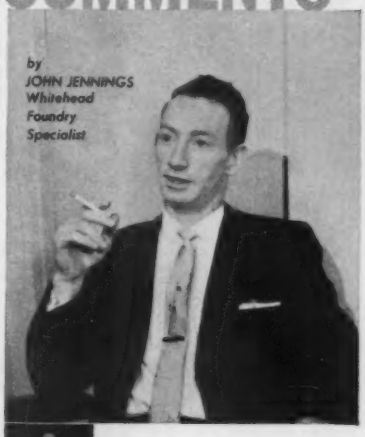
Hot Tearing—A. de Sy, J. van Eeghem and R. de Groote (Belgium) described a special test they had developed to determine effect of chemistry on hot tearing. A small charge of very rapidly melted steel is centrifuged into a chill mold to form a cylindrical test piece approximately ¼ in. in diam by 2½ in. long, with a substantial head at each end. This equipment gives reproducible results.

It showed clearly the bad effect of sulfur. Phosphorus was found to be about half as harmful as sulfur. Increase in carbon from 0.01 to 0.4 per cent also was deleterious. Manganese from 0.4 to 0.8 per cent appeared to be neutral. Increasing additions of aluminum up to 0.2 per cent were progressively harmful. This result was not correlated clearly with the form of the sulfides, and it was suggested that aluminum exerted its influence by its effect on residual oxygen.

Magnetic Properties of Cast Steel—The magnetic properties of cast steel were reported by H. Luling and K. Gut (Switzerland). If the highest saturation values are required, the steel must be of high purity and low in carbon. The cooling rate on these steels did not have much effect, and consistent magnetic properties were found throughout cast sections as heavy as 41 x 23 x 14 in. If high yield point and high saturation value were required, an increase in carbon gave the best result of the usual elements.

Among alloy steels, those with about 0.45 per cent molybdenum and 0.01 per cent boron or with about 2½ per cent nickel gave even better combinations of yield point and magnetic saturation value, the latter steel being preferred because of its known good foundry properties. The highest yield points with fairly good saturation values were given by precipitation hardening steels containing 0.8 per cent

CASTING * COMMENTS



* HAIL COLUMBIUM!

A Gem of an Alloy

The gem has many facets. For example, we recommend Shieldalloy's Columbium Nickel for Nickel-Copper Alloy (Monel), 70/30 Cupro-Nickel, and 90/10 Cupro-Nickel.

When silicon is low in these alloys, adding Columbium will help you meet strength requirements. When you increase the silicon to increase yields and tensile strengths, Columbium also helps; and, it makes the material weldable. I'm sure I don't have to explain how important the ability to repair weld castings is today. And, I've seen tests that show the addition of silicon *without* Columbium increases the tendency for weld cracking.

Shieldalloy Columbium Nickel has a melting point of 2150°F. It has a low Fe content, which assures your staying within the Fe range for castings for the Navy. And you get more free Nickel per pound of alloy. It's a high quality product, too, with a typical Lead content of 0.001% and a typical Tin content of 0.04%.

Call me if you'd like more information on this or any of the more than 100 alloys we handle.

WHITEHEAD METALS

Casting Comments by other Whitehead Foundry Specialists appear elsewhere in this issue. Look for them.

WHITEHEAD METALS, INC.
303 West 10th St., New York 14, N.Y.

For More Information Circle 653, Page 39

FOR EXAMPLE, IF YOU'RE FACED WITH THE PROBLEM OF MOVING MATERIALS FROM STORAGE TO PROCESSING EQUIPMENT...need accurate "metering" of flow rates...and want to reduce processing costs, your Carrier Vibrating Equipment Specialist can help you provide the efficient solution. He can show you how you can get substantial power savings...step up capacity...get the operating flexibility and efficiency that cut over-all costs.

Depending upon your operation and type of materials involved, he can show you how you can combine two or more steps into one cost-cutting operation... move and dewater or blend, separate, agglomerate, heat, cool or dry.

Why not have your Carrier Specialist study your operations with a view to reducing handling costs while increasing over-all efficiency. Remember, Carrier does more than just build equipment...we provide the specialized service that solves problems of moving and processing materials efficiently.

Call him or write Carrier Division of CHAIN Belt Company, 223 N. Jackson St., Louisville 2, Kentucky.

FOR ECONOMICAL MATERIALS MOVING
SEPARATING • FEEDING • DRYING • DEWATERING • COOLING
QUENCHING • COATING • DISTRIBUTING • ELEVATING

CARRIER
NATURAL FREQUENCY
VIBRATING EQUIPMENT

molybdenum and 0.3 per cent vanadium.

Calcium in Nodular Iron—T. Kusakawa (Japan) considered the role of calcium in the production of nodular iron. He covered the surface of molten iron in an induction furnace at different temperatures with layers of various nodularizing agents and also heated the agents in sealed cavities in iron to 2120° F. He concluded that magnesium is the most effective element.

Calcium had some effect at 2730° F, but not at 2120° F. Cerium was intermediate in its effect. Industrial trials were made with the injection of calcium silicide with nitrogen and also fluxing treatments with calcium silicide and mixed chlorides. In both treatments, cerium additions were necessary. Fluxing was considered to be better and capable of producing high mechanical properties.

Eutectic Cells in Gray Iron—G. Pelhan (Yugoslavia) discussed the forms of the eutectic cell in gray cast iron in relation to composition. He recognized four types of cell: 1. Irregular cells with coarse graphite flakes. 2. Globular cells with graphite rosettes increasing in size towards the edges of the cell. 3. Globular cells with uniform fine flakes. 4. Globular cells with spheroidal graphite.

Sulfur led to formation of nuclei and coarse graphite, but aluminum and titanium removed nuclei and refined graphite. Fine graphite was associated with undercooling at the eutectic point and coarse graphite with recalescence. It was concluded that graphite always is formed directly from the melt, apart from that formed by heat treatment in the solid state.

Vacuum-Melted Gray Iron—A. J. Zuithoff and R. Kortmulder (Holland) described work on the effect of vacuum melting on the structure of inoculated gray cast iron. The melts contained 3 per cent carbon and 3 per cent silicon and were made from Swedish charcoal iron. The iron was melted in pure alumina crucibles, the desired inoculant added, and the melts poured into a chill mold, all in vacuum. At a sulfur content of 0.007 per cent, all the vacuum melts, whether superheated or not, inoculated or not, and with or without manganese additions, showed solely interdendritic Type D graphite flakes, although the same irons melted in air responded normally to inoculation and formed Type A graphite.

If 0.12 per cent sulfur was added to a vacuum melt, normal graphite and normal response to inoculation followed, but the addition of 1.1 per cent manganese with the sulfur caused inversion to the abnormal D graphite. It was concluded that vacuum melting led to deoxidation and elimination of the fine oxide particles believed to be the nuclei controlling formation of graphite.

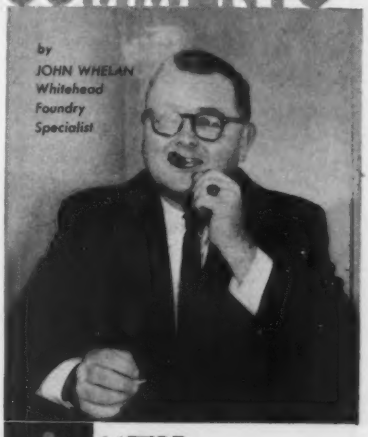
Materials for Piston Rings—C. English (Sweden) presented data on the mechanical properties of piston ring materials. Rings can be made either single-cast or as pots subsequently parted into rings. The latter can be centrifugally cast or cast in sand. Each method produces characteristic properties which were reported for the appropriate types of gray iron in a range of sizes together with the properties of alloy iron rings, heat treated rings, and rings in acicular iron, malleable iron, nodular iron, and steel.

Mechanical properties determined included complete stress-strain curves from which modulus of elasticity, proof stress, and total deformation were determined in addition to tensile strength and hardness. Microstructures were illustrated. From these results a summary table showing the range of properties to be expected for each type was presented, and some results of fatigue determinations were included.

Gray Iron Slag Composition—The effect of slag composition on the properties of cast iron was discussed by F. Varga (Hungary). For the experimental work, 4-lb charges were melted in new graphite crucibles in an electric furnace. The desired slag was stirred in, temperature held at 2640° F for a definite time, and the metal poured. Variables studied included the amount of each slag and the time of holding.

With lime-alumina-silica slags it was found that increasing basicity of slag decreased the carbon equivalent value of the iron, mainly because of decreasing silicon content. At the same time the graphite tended to change from Types D and E to Types A and, eventually, to C. Increasing slag volume and lengthening the time of superheating led to an increase in carbon

CASTING COMMENTS



"F" NICKEL AS RELATED TO °F.

I've often been asked why "F" Nickel does the best job for ladle or cupola addition – and it boils down to °F.

Primary Nickel has a melting point of 2600°F. BUT, even at temperatures as low as 2300°F., "F" Nickel Shot can be added in small amounts with complete solution assured. Go higher on the °F scale, and as much as 5% "F" Nickel may be added without trouble.

"F" Nickel is a versatile, 92% Ni-5½% Si alloy. As shot, sized on ¼" openings and retained on .0193" openings, it is ideal for ladle or spout additions. "F" Nickel also comes in ingot form for cupola addition.

It's used essentially to upgrade gray irons to higher tensile strengths. While performing this function, grain structure is improved and rejections are reduced.

Want to talk more about "F" Nickel? Give me a call.

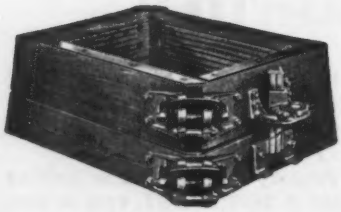
Casting Comments by other Whitehead Foundry Specialists appear elsewhere in this issue. Look for them.

WHITEHEAD METALS, INC.
303 West 10th St., New York 14, N.Y.

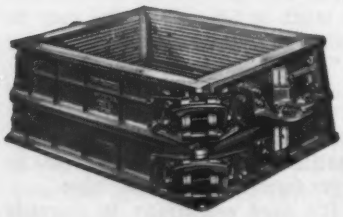
For More Information Circle 655, Page 39

REDUCE YOUR COSTS

ADAMS Cast Iron or Cast Aluminum Jackets



CHERRY EASY-OFF FLASK



ALUMINUM EASY-OFF FLASK

Look at these features and you'll agree that the Adams line can mean economy, efficiency, and better molds for your foundry.

Above is the Adams jacket available in either cast iron or cast aluminum. They are cast from a top grade metal mixture best suited for their purpose. The sturdy construction as a result of the vertical ribs inside and horizontal ribs outside plus the handles at either end assure you of long life for this equipment and ease in handling. These jackets afford you MAXIMUM STRENGTH and MINIMUM WEIGHT.

Here are jackets that assure you perfect mold fit—will give you the greatest strength while under pouring strain—allow for free flow of gases all because of INSIDE CORRUGATIONS. These VENTILATED jackets are first choice in foundries across the nation.

Look into the advantages cast iron or cast aluminum can offer you depending upon your foundry needs. We will be happy to make recommendations to fill your requirements.

For the most complete line of flask equipment available . . . always look to Adams!

The ADAMS Company

ESTABLISHED 1863

700 FOSTER STREET, DUBUQUE, IOWA, U.S.A.

MOLDING MACHINES and FLASK EQUIPMENT

QUICK—
ACCURATE
Temperature Readings
in Non-ferrous
Molten Metals with

XACTEMP
Trade Mark Reg U.S. Pat. Off.
HAND PYROMETERS

Accurate to Within a Fraction of a Scale Division

The XACTEMP PYROMETER makes possible better quality control and helps toward elimination of blowholes, burnouts, sand infiltration and other flaws due to incorrect temperature . . . affords a simple, effective means for accurate temperature measurement of molten, non-ferrous metals. Well-balanced, easy to handle . . . always ready for use and requires no preliminary adjustments.

Cast aluminum and brass construction. Indicator is of medium resistance not affected by thermocouple length . . . acts rapidly . . . provided with Alnico V magnet and direct reading dial starting at 50° F. 43" stainless steel extension . . . standard 7" Marshall tip permits true readings below surface of metal. Made to give good service for years. Order at once to be sure of immediate delivery from stock.

Catalog No. MM701 $68.50
Complete with Thermocouple..

Catalog No. 1449-501T Replacement Thermocouple Tip $7.00

Ask about XACTEMP PYROMETERS for all-around general temperature checking. A full line of thermocouples available in stock.

CLAUD S. GORDON CO.
Subsidiary of PneumoDynamics Corporation
MANUFACTURERS • ENGINEERS • DISTRIBUTORS
607 West 30th St., Chicago 16, Illinois
2027 Hamilton Ave., Cleveland 14, Ohio

saturation value and thus to lower mechanical properties.

Thin-Walled Molds—The use of thin-walled molds was discussed by B. V. Rabinovich, B. P. Platonov, and F. F. Rezinskikh (USSR). These molds were prepared by the R process, in which a layer of sand first was formed around the pattern by blowing and later compacted by pressing.

Several variations were possible, but one much used involved mounting the pattern on a vertical ram, bringing down a shaped blowing head over the pattern, and blowing the sand into the space between the head and the pattern. The head then was removed and replaced by a shaped flask into which the blown layer of sand fitted with some clearance. The ram was raised, causing the pattern to press the sand into firm contact with the flask, which finally was poured as usual. It was easily possible to arrange the design of the head and the flask so that different amounts of final compaction could be applied to different parts of the mold, leading to uniform final mold hardness.

This process was suitable for large numbers of the one item when the cost of special flasks was justified. For smaller numbers, a core assembly technique could be applied using CO_2 sand first blown, then compressed, and finally hardened.

Examples were shown of nodular iron crankshafts cast by both techniques. Even when the mold walls were only 5 mm thick, gray iron castings showed no chill, but the structure was finer since in such molds the rate of solidification is greater than in normal sand molds. The process was claimed to produce accurate castings with considerable savings in molding materials and with high productivity.

(To be concluded next month)

Oregon Chapter Officers

Morgan Rudich, Oregon Steel Foundry Co., has been elected chairman of Oregon Chapter of AFS for 1961-62. Other officers include Leonard Fortun, Federated Metals Div., American Smelting & Refining Co., vice chairman; H. Victor McCormick, Ingersoll Rand Co., secretary, and Jack A. Stephenson, Dependable Shell Core Machine Co., treasurer.

CASTING COMMENTS

SILICON DOLLARS AND CENTS

This is addressed to all gray iron foundries with a cost problem. (In other words, just about all gray iron foundries.)

The subject is silicon. I'm often asked which, out of all the grades available, is the cheapest. I don't like the word "cheap" in any form, so let's substitute "most economical" for it. In that case, my answer is 50% Ferrosilicon.

50% Ferrosilicon is the "most economical" way to get silicon into the cupola. And, you get a more consistent recovery in your daily operation, which will result in more uniform analyses, with less chance of expensive casting rejects. 50% Ferrosilicon is available with varied Boron contents. Malleable foundries, that are sometimes bothered by Chromium build-up due to purchased scrap, really appreciate this feature.

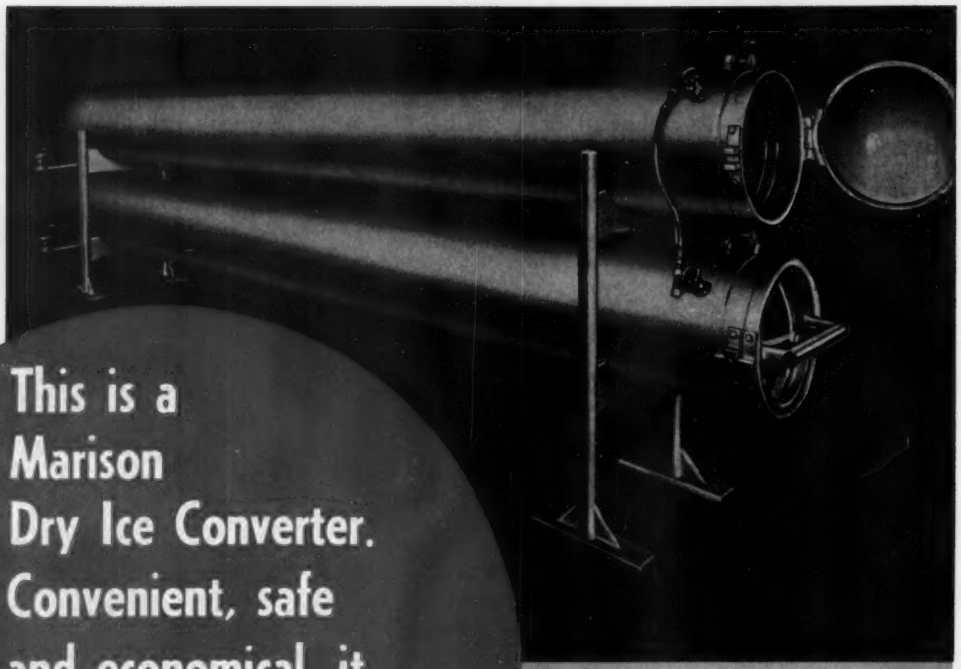
Of course there may be situations where this alloy is not the best bet. In that case, we can and do recommend Ferrosilicon Briquettes, Silvery Pig, or any of the many other types of Ferrosilicon or Silicon Metal alloy products we stock.

If you've any questions on Silicon, or any of our other foundry alloys, give me a call.

WHITEHEAD METALS

Casting Comments by other Whitehead Foundry Specialists appear elsewhere in this issue. Look for them.

WHITEHEAD METALS, INC.
303 West 10th St., New York 14, N.Y.



This is a Marison Dry Ice Converter. Convenient, safe and economical, it is saving money every day for foundrymen using the CO_2 process.

CO_2 liquid (for refilling cylinders) or CO_2 gas for blowing into cores or molds can be made instantly available in the Marison Dry Ice Converter where it is stored after conversion. These Converters are furnished in sizes ranging from twenty five pounds to one thousand pounds capacity. You simply load the dry ice into the Converters, lock them, and in about twelve hours you will be in business . . . . the CO_2 business, that is. Faster conversion (about one hour) may be accomplished by spraying hot water on the Converter. Marison equipment is made to conform to rigid safety regulations, American Society of Mechanical Engineers. Marison Dry Ice Converters don't require power, electricity or refrigeration. Worth investigating, aren't they?

We also manufacture a full line of carbon dioxide cylinders. Write today for some very helpful literature about our products.

THE MARISON COMPANY

BOX 178 S. ELGIN, ILLINOIS SHERWOOD 2-2500

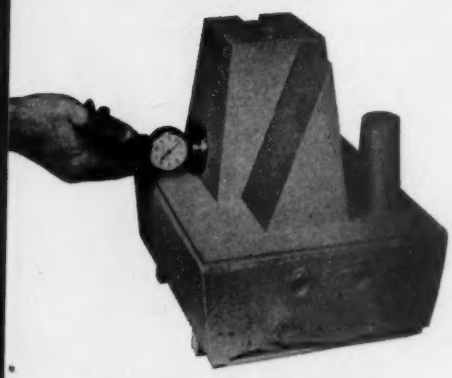


Fig. 1—Pocket size mold creep tester measures resistance sand will offer to mold wall movement

HIGH GREEN STRENGTH

Can Offer Advantages

By HARRY W. DIETERT
Chairman of the Board
Harry W. Dietert Co., Detroit

● HIGH GREEN STRENGTH in molding sand is advantageous when castings must have accurate contour, controlled weight, and high dimensional accuracy, so long as the sand is prepared to meet a constant moldability index.[1]

When a high-strength sand meets this moldability requirement, it will have good rammability or workability. Therefore, the higher the green strength is for a given method of ramming (up to 18-20 psi or even higher), the lower the mold wall movement or mold creep will be and the casting will be sounder, weigh less, have better accuracy, and possess a better finish.

Test Results—Data presented in Table I demonstrate that the high-strength, low-creep sand results in better castings than low-strength, high-creep sand. Molds made from the sand with compressive strength of 7.1 psi showed 0.005 in. mold creep and the castings averaged 789.4 grams. At the same time, molds made from high-strength sand with compressive strength of 15.6 psi and creep of 0.001 in. yielded castings weighing an average of 778.8 grams. Sand burn-on for castings made in the low-strength sand molds averaged 28.8 grams but burn-on for castings made in high-strength sand molds averaged only 1.2 grams.

Resistance that sand will offer to mold wall movement is measured easily on the mold surface by a mold creep tester as shown in Fig. 1. The distance that the penetrator on the device enters the mold wall is a measure of the mold wall movement that will take place when molten metal enters the molds.

TABLE I—Sand Properties

Sand Properties	Low Strength Sand	High Strength Sand
Compressive strength ..	7.1 psi	15.6 psi
Green deformation	0.017 in.	0.016 in.
Mold creep	0.005 in.	0.001 in.
Sand burn-on	28.8 grams	1.2 grams
Casting weight	789.4 grams	778.8 grams

Mold creep is measured in thousandths of an inch.

Fig. 2 illustrates the relationship between green compressive strength and mold creep. A Michigan lake

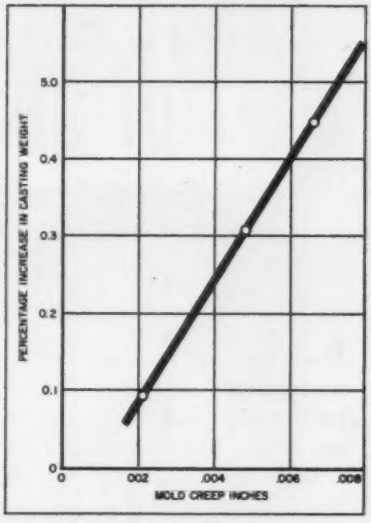


Fig. 3—Increase in mold creep yields heavier castings

Fig. 2—Graph illustrates the relationship between green strength and mold creep

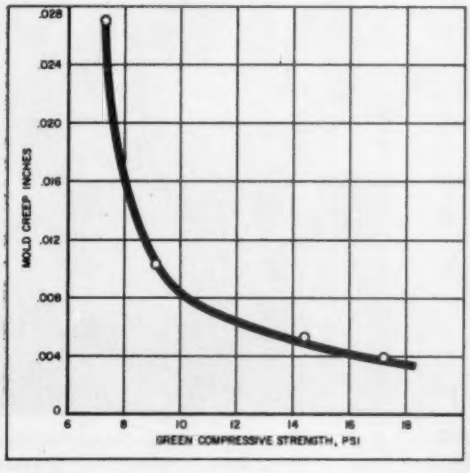
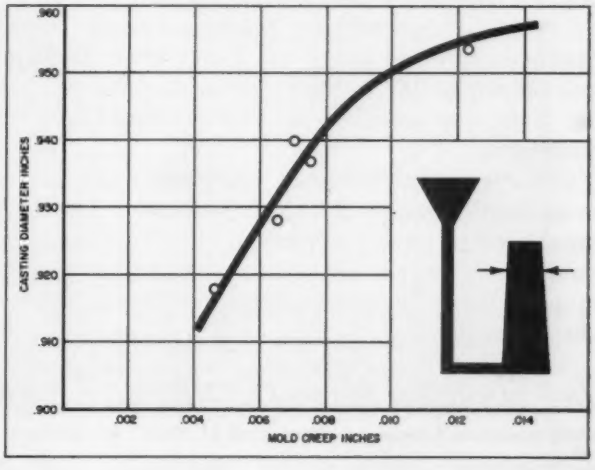


Fig. 4—Diameter of this test casting increases as mold creep goes up; the casting accuracy decreases



■ *Osborn Field Report*

WATCH HOW WESTINGHOUSE STAYS COMPETITIVE ON LARGE MATCH-PLATE MOLDING WITH OSBORN ROTA-LIFT®

How can we improve our competitive position on large match-plate molding? Like many jobbing and semi-production foundries today, Westinghouse finds their answer in *mechanization*—with Osborn ROTA-LIFT.

Westinghouse has been using this Osborn ROTA-LIFT Molding Machine to ram a wide variety of large molds at their Cleveland Lighting Division foundry for nearly two years. Result: mold quality and efficiency of manpower utilization *up* . . . mold production costs *down* . . . *important competitive advantages for any foundry.*

At Westinghouse a single ROTA-LIFT operator easily does all five major match-plate molding operations—jolt . . . roll . . . squeeze . . . draw . . . close. Turns out a finished mold every 3 to 5 minutes. ROTA-LIFT is quickly adjustable to their various flask sizes . . . handles big jobs that couldn't be run economically on other equipment.

Osborn can recommend the right model ROTA-LIFT to streamline your molding operations . . . help keep your quotes competitive . . . increase your profit margin on a wider range of work. Write or call for details.

OSBORN®

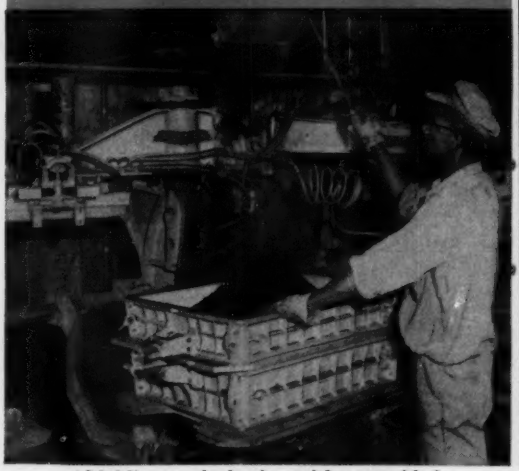
THE OSBORN MANUFACTURING COMPANY

5401 Hamilton Avenue • Cleveland 14, Ohio • ENdicott 1-1900

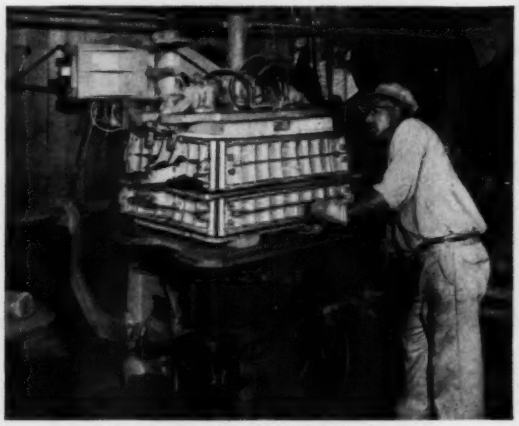
Molding Machines • Shell Core Machines • Core Blowers • Metal Finishing Machines . . . and Finishing Methods • Industrial Brushes

MEMBER FEMA

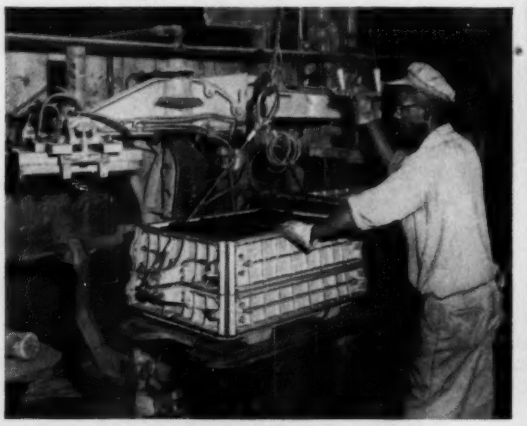
Photo sequence on ROTA-LIFT operation at Westinghouse Cleveland foundry



1. Molding cycle begins with assembled flask and pattern on ROTA-LIFT table. Operator fills drag with sand from overhead hopper.



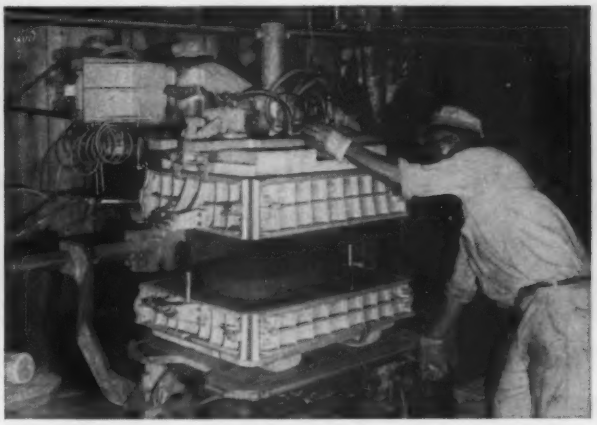
3. After cope is filled and rammed, ROTA-LIFT squeezes cope and drag. Flask being run here is 24″ x 33″—8″ cope over 6″ drag.



6. Finished mold is transferred by hoist from ROTA-LIFT table to conveyor for stripping and pouring.

2. With drag jolted, rammed and bottom board in place, operator hits knee valve. ROTA-LIFT arms raise flask for quick, easy rollover. Fingertips guide rolling action—no heavy muscle-work required.

4. With cope clamped, drawn and swung out of way at left, heavy pattern plate is easily drawn by operator using ROTA-LIFT Match-Plate Handler.



5. Cope is swung into closing position and drag raised until it contacts cope. Match-plate handling device holds pattern at right.

. . . and ROTA-LIFT
can save time
. . . muscle
. . . money in
your foundry

7. Operator assembles flask for next cycle. ROTA-LIFT at Westinghouse turns out finished molds of this size at rate of 15 to 20 per hour.

For More Information Circle 660, Page 39

■ *Osborn Field Report*

WATCH HOW WESTINGHOUSE STAYS COMPETITIVE ON LARGE MATCH-PLATE MOLDING WITH OSBORN ROTA-LIFT®

How can we improve our competitive position on large match-plate molding? Like many jobbing and semi-production foundries today, Westinghouse finds their answer in *mechanization*—with Osborn ROTA-LIFT.

Westinghouse has been using this Osborn ROTA-LIFT Molding Machine to ram a wide variety of large molds at their Cleveland Lighting Division foundry for nearly two years. Result: mold quality and efficiency of manpower utilization *up* . . . mold production costs *down* . . . *important competitive advantages for any foundry.*

At Westinghouse a single ROTA-LIFT operator easily does all five major match-plate molding operations—jolt . . . roll . . . squeeze . . . draw . . . close. Turns out a finished mold every 3 to 5 minutes. ROTA-LIFT is quickly adjustable to their various flask sizes . . . handles big jobs that couldn't be run economically on other equipment.

Osborn can recommend the right model ROTA-LIFT to streamline your molding operations . . . help keep your quotes competitive . . . increase your profit margin on a wider range of work. Write or call for details.

OSBORN®

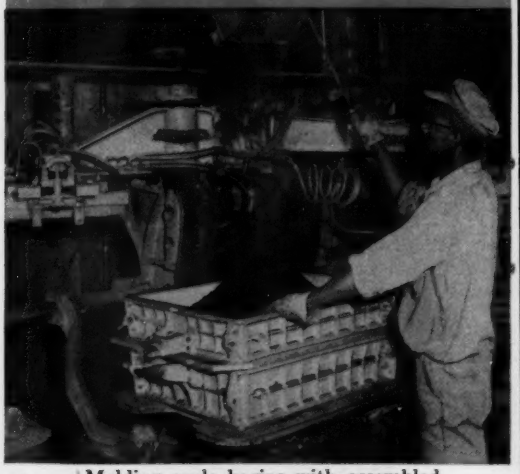
THE OSBORN MANUFACTURING COMPANY

3401 Hamilton Avenue • Cleveland 14, Ohio • ENdicott 1-1900

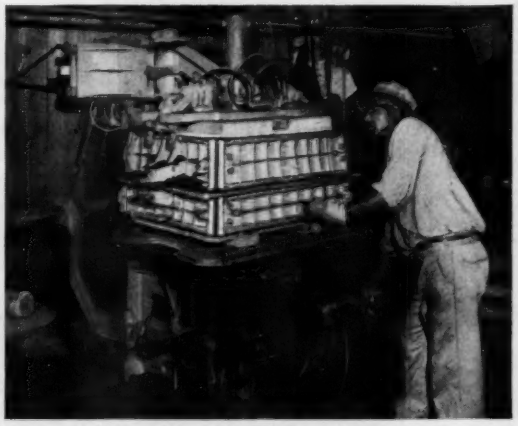
Molding Machines • Shell Core Machines • Core Blowers • Metal Finishing Machines . . . and Finishing Methods • Industrial Brushes

MEMBER FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION FEMA

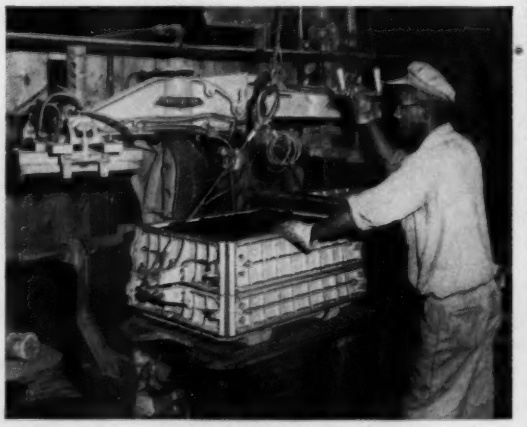
Photo sequence on ROTA-LIFT operation at Westinghouse Cleveland foundry



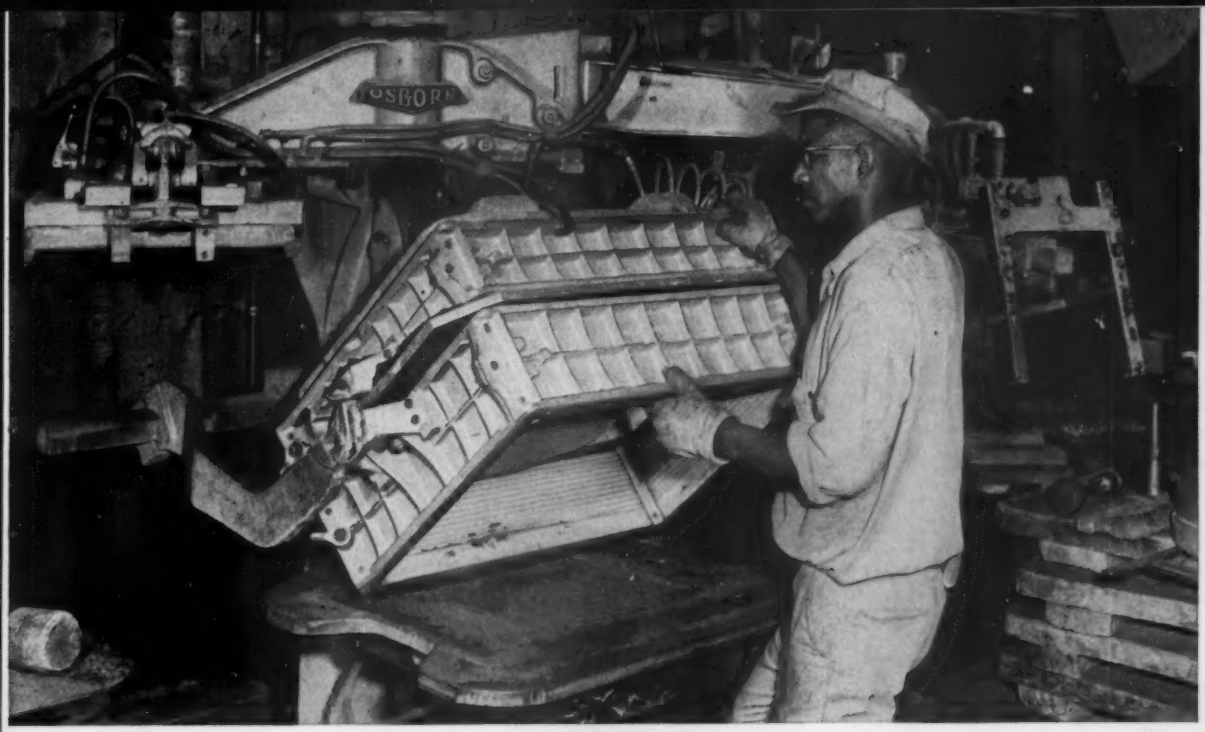
1. Molding cycle begins with assembled flask and pattern on ROTA-LIFT table. Operator fills drag with sand from overhead hopper.



3. After cope is filled and rammed, ROTA-LIFT squeezes cope and drag. Flask being run here is 24″ x 33″—8″ cope over 6″ drag.

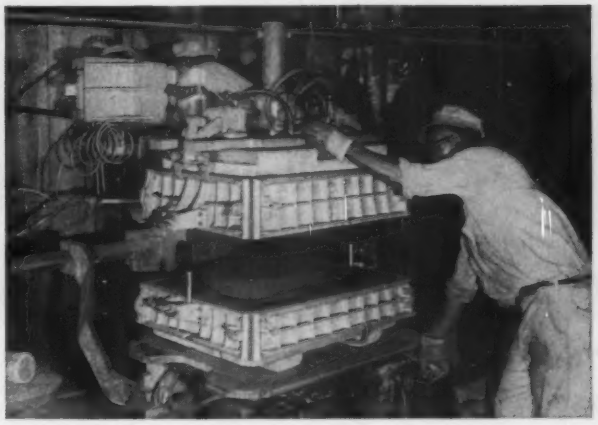


6. Finished mold is transferred by hoist from ROTA-LIFT table to conveyor for stripping and pouring.



2. With drag jolted, rammed and bottom board in place, operator hits knee valve. ROTA-LIFT arms raise flask for quick, easy rollover. Fingertips guide rolling action—no heavy muscle-work required.

4. With cope clamped, drawn and swung out of way at left, heavy pattern plate is easily drawn by operator using ROTA-LIFT Match-Plate Handler.



5. Cope is swung into closing position and drag raised until it contacts cope. Match-plate handling device holds pattern at right.

. . . and ROTA-LIFT
can save time
. . . muscle
. . . money in
your foundry

7. Operator assembles flask for next cycle. ROTA-LIFT at Westinghouse turns out finished molds of this size at rate of 15 to 20 per hour.

For More Information Circle 660, Page 39

sand was bonded with 4, 6, 8, and 10 per cent western bentonite to produce different green compressive strengths. The sand was rammed with ten jolts and squeezed five seconds at 95 psi. As can be seen in the graph, mold creep for sand rated at 7.7 psi green compressive strength is 0.027 in; at 9.1 psi strength, creep is 0.010 in.; and at 17.2 psi strength, creep is 0.004 in.

During additional testing of these sands, the mold hardness at the parting line was found to range from 85 to 89. This demonstrates that mold hardness and mold creep do not measure the same property.

In practice, one can use a graph similar to that shown in Fig. 3 to anticipate the percentage of casting weight increase due to an increase in mold creep. For example, a mold with a mold creep of 0.002 in. will produce castings 1 per cent heavier than the calculated weight. Increasing mold creep to 0.006 in causes an increase in casting weight of 4 per cent.

Casting dimensional accuracy is closely related to mold creep also, as is illustrated by Fig. 4. Casting diameter, 1 in. from the top, is plotted versus mold creep. A mold creep of 0.004 in. yields a casting diameter of 0.910 in. and when creep is increased to 0.010 in., the diameter increases to 0.950 in.

Conclusions—Green strength, imparted to sand by the bonding agent and intensive mixing, as measured by compression, shear, or tensile tests, is important in rating molding sand, especially when high-quality castings are being produced.

When sand is prepared to meet a predetermined moldability, variables such as the optimum amount of water and rammability are taken care of automatically.

Mold creep is sensitive to changes in strength in the low strength range but in the high-strength range (above 18 psi) mold creep changes slowly with changes in strength. Other sand properties such as moldability, grain structure, additives, and mold hardness must be controlled to accomplish minimum mold creep.

High green strength sand, with moldability controlled between 80 and 90, is a distinct advancement in the production of high-quality molds for better castings.

Reference

1. H. W. Dietert, A. L. Graham, and T. H. Hanna, "Controlling Sand Moldability and Mold Quality," FOUNDRY, May, 1961, p. 238.

Issues Supplements to 1958 Book of ASTM Standards

Supplements to the 1958 Book of ASTM Standards contain specifications, tests, definitions, and recommended practices for ferrous metals, nonferrous metals and electronic materials, testing methods, masonry products, petroleum products, road materials, gaseous fuels, plastics, and textiles. They have been published by the American Society for Testing Materials.

The Book of ASTM Standards is published triennially and in the intervening years Supplements are issued to each of the 10 parts of the book. Supplements cost $4.00 per part, or $40.00 per set, and can be obtained from American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

For high-precision hollow castings from any alloy... in any configuration

Sherwood Ceramic Preformed Cores

The Sherwood Process assures close-tolerance coring accuracy, produces hollow sections without design compromise . . . cuts production costs

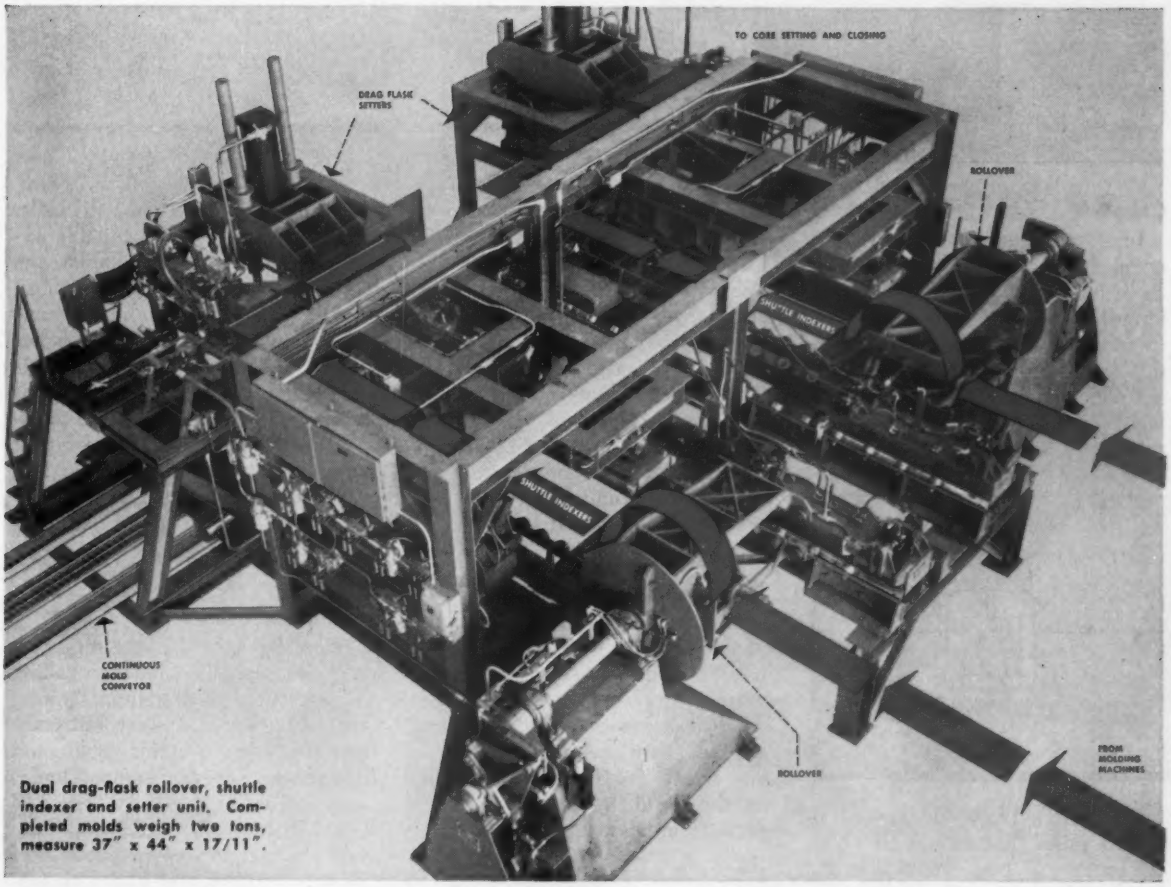
Sherwood ceramic preformed cores are custom designed to exacting tolerances to produce smooth, as-cast internal surfaces, specific wall thicknesses. Substantially volume stable and containing no residual gas, they may be used with vacuum-cast or air-cast alloys at temperatures in excess of 3000°F without fracture or distortion.

Sherwood cores overcome disadvantages of conventional coring techniques. Custom formulae for each application eliminate metal/core reactions and assure complete compatability with all methods of precision casting.

Sherwood cores are proving themselves in countless critical applications . . . everywhere.

Send for technical design data!

Sherwood Refractories
Division of H. J. Sherwood, Inc.
16601 Euclid Avenue • Cleveland 12, Ohio



Dual drag-flask rollover, shuttle indexer and setter unit. Completed molds weigh two tons, measure 37" x 44" x 17/11".

Planet system automatically strips and closes 250 one-ton flasks on continuous mold conveyor

To design a system that will strip and close flasks automatically on a continuously moving conveyor has always been a perplexing problem. But Planet Corporation solved this problem for one of the automotive industry's largest foundries . . . and at the same time provided the key to increase productivity approximately 400%. In addition, this unusual system provides maximum casting flexibility and operational reliability.

Flask Handling System Operation . . .

Following molding, the drag flasks are fed into the dual drag-flask rollover, shuttle indexer and setter unit (see diagram). The flasks are rolled over 180°, then indexed to the unique in-flight setters which accurately positions them on the continuously moving car-top mold conveyor. From this point, they are moved through core setting to the dual cope-flask-closing unit. The cope-flask subsystem, from molding to closing, is similar to the drag-flask unit except rollovers are not required.

After pouring and cooling, the cope-flask-stripper unit lifts the cope flask off the drag. The drag flask continues on the mold conveyor to the drag "pick-off", or lifting, device. On their removal from the conveyor, the flasks are recirculated through the system. Both removal operations are performed while the mold conveyor moves as a constant speed.

This integrated materials handling system *increased productivity approximately 400% and resulted in substantial cost savings.*

Production Flexibility . . .

With this flask handling system, it is possible to produce either six-or four-cylinder blocks or both simultaneously. This feature provides this large automotive foundry with maximum casting flexibility . . . a maximum capacity of 500 blocks an hour.

Built-in Reliability . . .

Flasks handled by this system are controlled electrically and are locked at each position. They are parted or joined by lifting or lowering movements to eliminate damage to parting surfaces. The control system, which required more than 10 miles of wire and 600 relays, includes a feedback feature which allows pinpoint maintenance.

For additional operational reliability, this system was shop wired and piped, and shop tested.

An Example of Planet Versatility . . .

This is one example of Planet Versatility . . . Planet Corporation's ability to engineer, fabricate and install custom equipment that solve materials handling problems. Planet Versatility means you'll benefit from our diversified experience gained through service to leading corporations. It has paid them to plan with Planet . . . it will pay you, too! Write or call for complete information.

Sales Offices in Principal Cities in the United States and Mexico

PLANET CORPORATION
1818 SUNSET AVENUE
LANSING, MICHIGAN

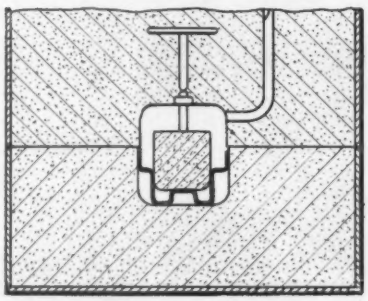
- Engineered Handling Equipment
- Automation Equipment
- Mill & Foundry Equipment

For More Information Circle 662, Page 39

PATENTS of INTEREST

Chaplet

Improved chaplet which supports a core in at least three directions is formed from a thin strip of perforated metal. Design is claimed to minimize any chilling effect, permit free flow of metal around the chaplet, and prevent the entrapment of gas. One type is comprised of a base with a centrally lo-



cated portion projecting inward to form a raised, flat surface on which the core rests. Legs extend from the base, and portions of the legs are adapted to support the sides of the core. Upper ends of the legs are offset outward to contact the side walls of the mold cavity. This feature braces the chaplet to prevent lateral movement. *Patent No.* 2,985,930 *granted to H. H. Hohlfelder Jr., and assigned to F. Hohlfelder Co.*

Nodular Iron

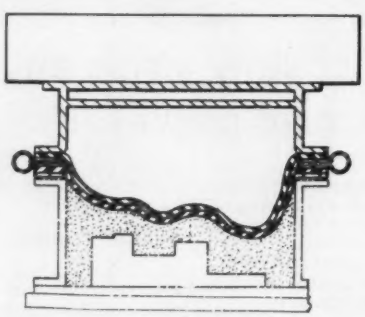
Method of producing nodular cast iron is accomplished by subjecting the molten iron in a furnace to action of a slag composed of 3 per cent limestone, 0.75 per cent fluorspar and 1 per cent coke for 10 to 20 minutes. Metal is tapped into a ladle and treated with 1 to 2 per cent of a mixture comprised of 2 to 4 parts calcium silicide and 1 part rare earth fluorides. *Patent No.* 2,980,530 *granted to L. C. Crome and assigned to Dayton Malleable Iron Co.*

CO_2 Process

Improvement in the CO_2 process for making molds and cores is said to result from use of an alkaline earth metal hydroxide or oxide such as calcium hydroxide or oxide in combination with an organic binder. Latter may be a water-soluble cellulose ester or ether such as ethyl hydroxyethyl cellulose, methyl cellulose, carboxymethyl cellulose, etc. Amount of calcium hydroxide or oxide added to the sand is from 1 to 10 per cent, and the organic binder 0.1 to 3 per cent by weight. *Patent No.* 2,987,789 *granted to R. E. Moren and assigned to Mo och Domsjo Aktiebolag.*

Diaphragm Molding

Improvement in diaphragm molding machines is said to result from use of a double diaphragm with means to evacuate the air between the two members of the diaphragm so that they essentially move as one when forced against the sand in the mold by air pressure applied from above.



Vacuum also is employed to draw the two diaphragms up into the head between operating cycles. Double diaphragm is used to eliminate problems from puncturing. *Patent No.* 2,962,776 *granted to R. W. Taccone and assigned to Taccone Pneumatic Foundry Equipment Corp.*

Malleable Iron

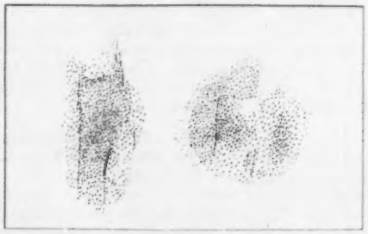
Procedure involves use of silvery or malleable pig iron containing appreciable amounts of boron. Those pig irons are made by the addition of powdered oxygen-bearing boron compounds such as boric oxide, boric acid, and alkaline meta and tetraborates to the metal stream flowing from the blast furnace into the ladle. Indications are that by suitable additions of the boron compounds, the silvery pig will contain from 0.0024 to 0.1 per cent boron and the malleable pig from 0.0012 to 0.05 per cent boron. In production of malleable iron, sufficient of the pig irons is added to the metal charge to result in 0.00024 to 0.005 per cent boron in the product. *Patent No.* 2,984,564 *granted to C. L. Altenburger and assigned to National Steel Corp.*

Aluminum Bronze

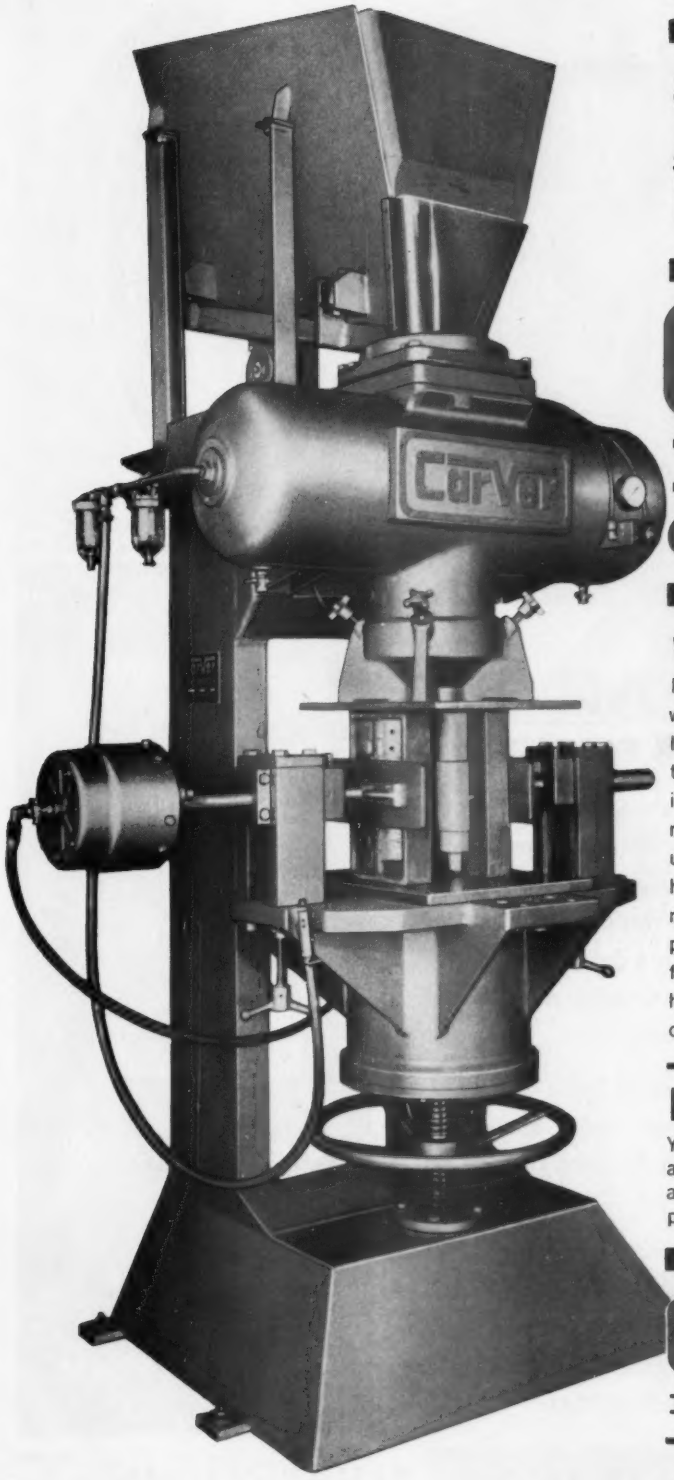
Alloy for deep drawing dies with corrosion resistance and non-galling characteristics of aluminum bronze, but with improved wear resistance and toughness contains cobalt and manganese. Specific composition is indicated as 15.10 Al, 5.01 Fe, 3.18 Co, 2.78 Mn, and 73.93 Cu. Castings are heat treated in the range of 1050 to 1400° F and cooled rapidly at a rate faster than 20 degrees Fahrenheit per hour per inch of section. Stress relief is accomplished in the range of 650 to 1050° F. *Patent No.* 2,979,397 *granted to J. F. Klement and assigned to Ampco Metal Inc.*

Crack Detector

Method for detecting fatigue cracks of extremely small magnitude in a material subject to repeated stress employs a sheet or film of



transparent, pressure-sensitive adhesive material. Suitable material is commercially available variety such as Scotch Tape, and is applied to the surface of a metallic specimen to be examined. A fluctuating stress is applied to the specimen in



NEW

and Priced for Any Foundry Large or Small

CarVer RAPID CORE SHOOTER

with Changeable Clamping Device

It took years to perfect . . . but you'll agree it was worth it! New Carver Rapid Core Shooter turns out better cores in amazingly fast time . . . without wear to core boxes, metal or wood. New time-saving flexibility with Changeable Clamping Device enables one man to handle complete operation without turning or unnecessary steps. A **rugged**, reliable machine that handles even the most intricate cores. 100% pneumatic operation — push-button controlled. New hopper provides better sand flow. New type cylinder screen for all fineness of sands. Large air reservoir for much harder ram. Fewer working parts keep maintenance costs at a minimum.

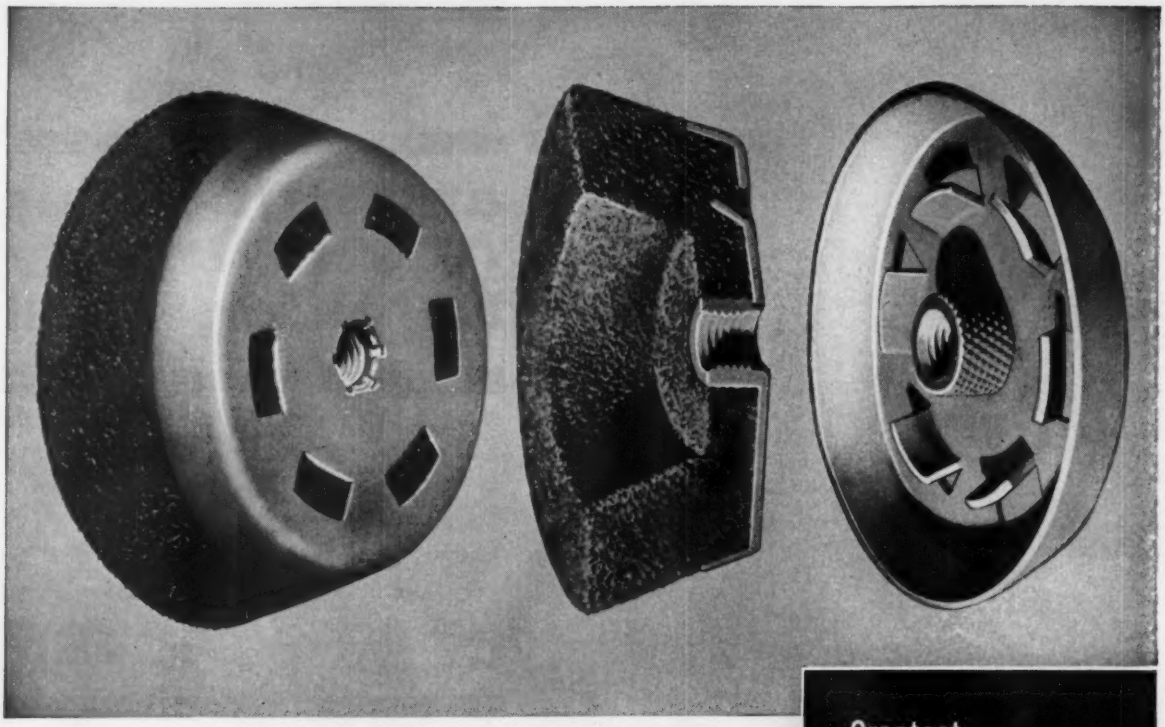
PRICED FOR TODAY'S MARKET

You'll like the speed, the accuracy, the versatility, and above all, THE PRICE. Wait till you see it . . . and don't wait too long. In fact, write today for complete information and prices.

CarVer FOUNDRY PRODUCTS
MUSCATINE, IOWA

EVERYTHING FOR THE CO_2 PROCESS—
Rapid Core Shooter • Rapid Muller • Steinex Binder
Krauss Self-cleaning Taper Slot Core Vents • Automatic Gassing Apparatus

For More Information Circle 663, Page 39



MANHATTAN

THE ORIGINAL *SAFETY BACK* FLARED CUP

The first wheel to offer the exclusive features of the Safety Back Flared Cup! This totally new concept of design *and* construction puts portable wheel *safety* where it counts the most — in *original* strength and breakage resistance! With Safety Back, steel covers the entire back of the flared cup . . . extends down the side to assure a degree of reinforcement never before available with anchor bushings, safety rings, special hub mountings or ordinary revolving cup guards.

You can't get a safer wheel to use . . . and you can't find a better performing wheel to use on your portable grinders. Every Manhattan Safety Back Flared Cup is custom-bonded with the right abrasive for *faster* removal of *more* metal on your particular job — at no extra cost!

For faster cutting, longer lasting, *safer* abrasive wheel performance — "More Use per Dollar" — be certain you get the original Manhattan Safety Back Flared Cup. Let your Manhattan abrasive wheel engineer show you the exclusive advantages of this and other Manhattan high speed, heavy duty abrasive wheels. Write for Bulletin 7157.

- Greatest Initial Strength
- Easy Mounting — Easy Operation
- Highest Safety Factor
- Requires No Adjustment
- One Piece Assembly
- Improved Mounting Base

"MORE USE PER DOLLAR"

RM 1060

ENGINEERED RUBBER PRODUCTS . . . MORE USE PER DOLLAR

RM

WRITE TO ABRASIVE WHEEL DEPARTMENT

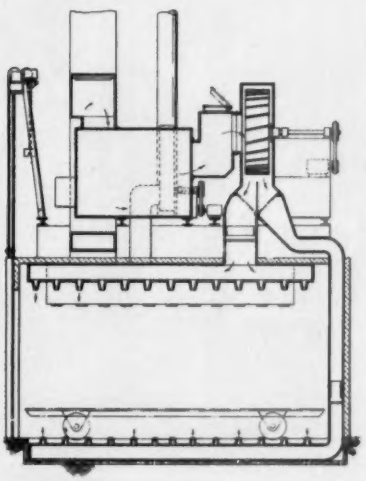
MANHATTAN RUBBER DIVISION • PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

the conventional manner and the surface covered by the film is observed with the aid of illuminating light striking the surface at a grazing incidence. Areas or boundaries of small bubbles underneath the surface of the film make it possible to locate the fatigue cracks in minute form more easily than by observing the surface of the material. *Patent No. 2,984,101 granted to I. C. Minor and J. A. Bennett and assigned to the United States of America.*

Drying and Cooling

Oven for drying and cooling large molds contains ducts in the ceiling and floor for admission of heated and cold air. Heated air is supplied by a fuel-fired unit on top of the furnace while cold air is taken

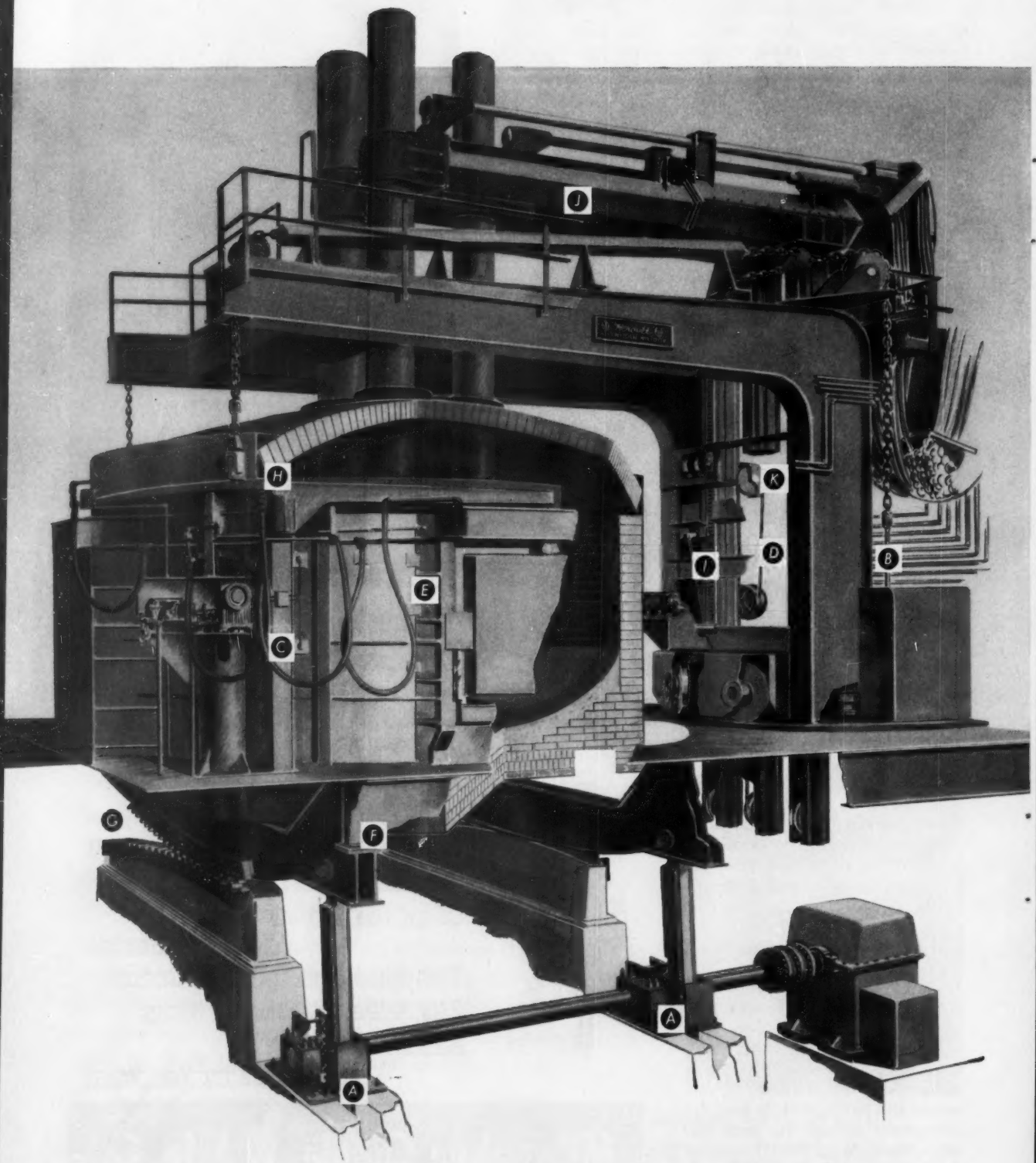


from the atmosphere. Oven contains two ducts in the ceiling and a like number in the floor and is equipped with numerous nozzles to distribute the air up and down.

A collector duct with openings into each of the four upper corners takes some of the oven atmosphere for recirculation through the heating unit. Another collector duct, also with openings into the corners, exhausts part of the oven atmosphere to an exit stack. During drying, hot air from the heating unit is forced into the oven. Cooling is accomplished by shutting off the burner and forcing cold air from the atmosphere through the same system. *Patent No. 2,988,351 granted to C. H. Barnett and R. E. Teagle and assigned to Foundry Equipment Co.*

For More Information Circle 665, Page 39

Get acquainted with the



This mark tells you a product is made of modern, dependable Steel.

finest Electric Furnace available

The oldest, most famous electric furnace is also the most modern. Completely up-to-date in every respect, the speed, yields and quality of melts produced by a Heroult electric furnace cannot be surpassed. Check the vital features of the Heroult electric furnace and see for yourself.

The Heroult is as versatile as it is efficient. With a capacity range of 3 to over 200 tons, the Heroult can handle either ferrous or non-ferrous melting, can be charged through top or door, can accommodate induction-stirring equipment, and can be adapted for duplexing.

If you're looking for performance, efficiency, economy and low-cost maintenance, consider these features:

1. Heroult Furnaces are 100% mechanically operated. Including **(A)** heavy rack-and-pinion-type tilting mechanism, **(B)** motor-driven, rotating, jib-type roof swing, **(C)** winch-operated, water-cooled, jib-type door-lift mechanism, and **(D)** high-speed, electro-mechanical electrode-positioning mechanism.

2. Cage-type shell construction with shell plates loosely attached **(E)** to heavy supporting structure. This construction minimizes shell warping and allows easy replacement of damaged shell plates.

3. Operating mechanism independently supported. The tilting platform on which all operating mechanisms are supported is attached directly to the rockers independent of the shell structure **(F)**. Thus, operating mechanisms are unaffected by shell distortion.

4. Water-cooled, Skew Back Roof ring. This feature **(H)** eliminates the need for special skew-shaped roof refractories.

5. Electrode Mast Safety Device. This spring-loaded, rack-and-pawl-type device **(I)** provides positive protection against damage resulting from electrode winch cable breakage.

6. Square-section, Water-Cooled Electrode Mast Arms. This design **(J)** guarantees a rigid connection between mast and mast arm, thus helping to maintain proper electrode position.

7. Remote-Controlled Electrode Clamps. This device, of the spring-clamp, air-release type, is located inside of the rear section of the water-cooled mast arm where heat cannot affect it.

8. Square-Sectioned Electrode Mast. This design feature **(K)**, developed by American Bridge, assures proper guiding and electrode positioning.

9. Rockers. The heavy fabricated steel curved top and bottom rockers **(G)** minimize forward travel during tilting. These rockers are designed so that the furnace will tend to return to horizontal position from any degree of tilt.

Next time you want to increase or improve your production, call American Bridge. We offer complete electric furnace design, construction and installation.

USS is a registered trademark

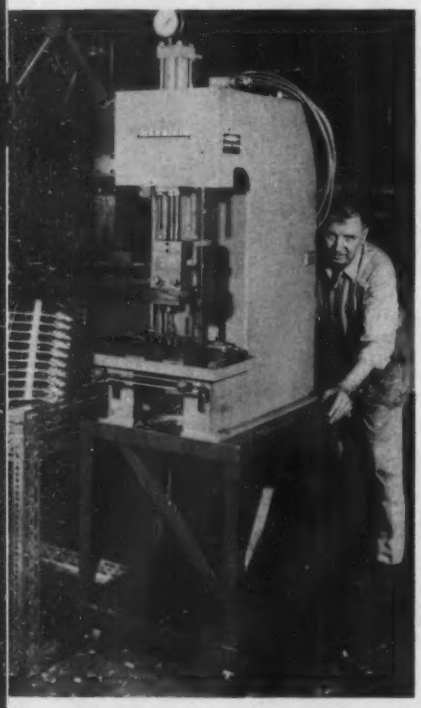
General Offices: 525 William Penn Place, Pittsburgh, Pa. Contracting Offices in: Ambridge • Atlanta • Baltimore • Birmingham • Boston • Chicago • Cincinnati Cleveland • Dallas • Denver • Detroit • Elmira • Gary • Harrisburg, Pa. • Houston • Los Angeles • Memphis • Minneapolis • New York • Orange, Texas • Philadelphia • Pittsburgh • Portland, Ore. • Roanoke • St. Louis • San Francisco • Trenton • United States Steel Export Company, New York

American Bridge Division of United States Steel

USS

Worker is cutting small diecastings from the central gate. The press is a 4-ton capacity hydraulic type

Each press can be moved where it is needed, ending damage caused by moving diecastings to the press



Mobile Trim Presses

Protect Diecastings . . . Simplify Scheduling

● MANY DIECASTING SHOPS encounter the costly problem of bending or otherwise damaging still-warm castings while transporting them from the diecasting department to the trimming department. Anderson Tool & Mfg. Co., Chicago, was faced with this problem, and it did something about it.

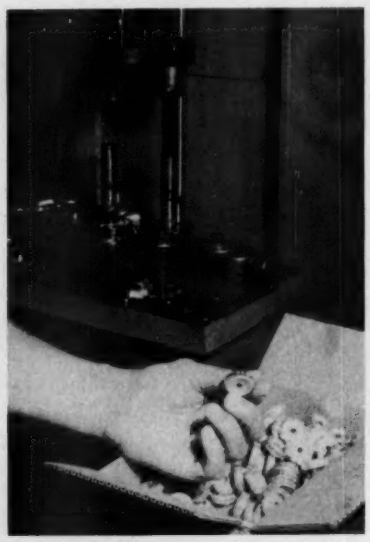
Since damage occurred during movement of the castings to the trimming department, management at Anderson Tool decided to move the trimming department to the castings. Their first thought was to relocate mechanical presses from their press department, placing one beside each diecasting machine. This solution appeared uneconomical, however, for it would have been impractical to use those presses for anything other than trimming, although in a job shop versatility of press application is vital to profitable operation.

In addition, such a move would have tended to make trimming operations inflexible. Each diecasting machine would have been limited to making castings that could be trimmed by the press next to it. The solution was to leave the mechanical press department intact, where it could continue to serve other operations of the company, and also trim some castings which could be moved without damage.

To find the best presses to work with the diecasting machines, Anderson looked to the hydraulic press field, and 4-ton Hannifin FD presses were chosen for the job.

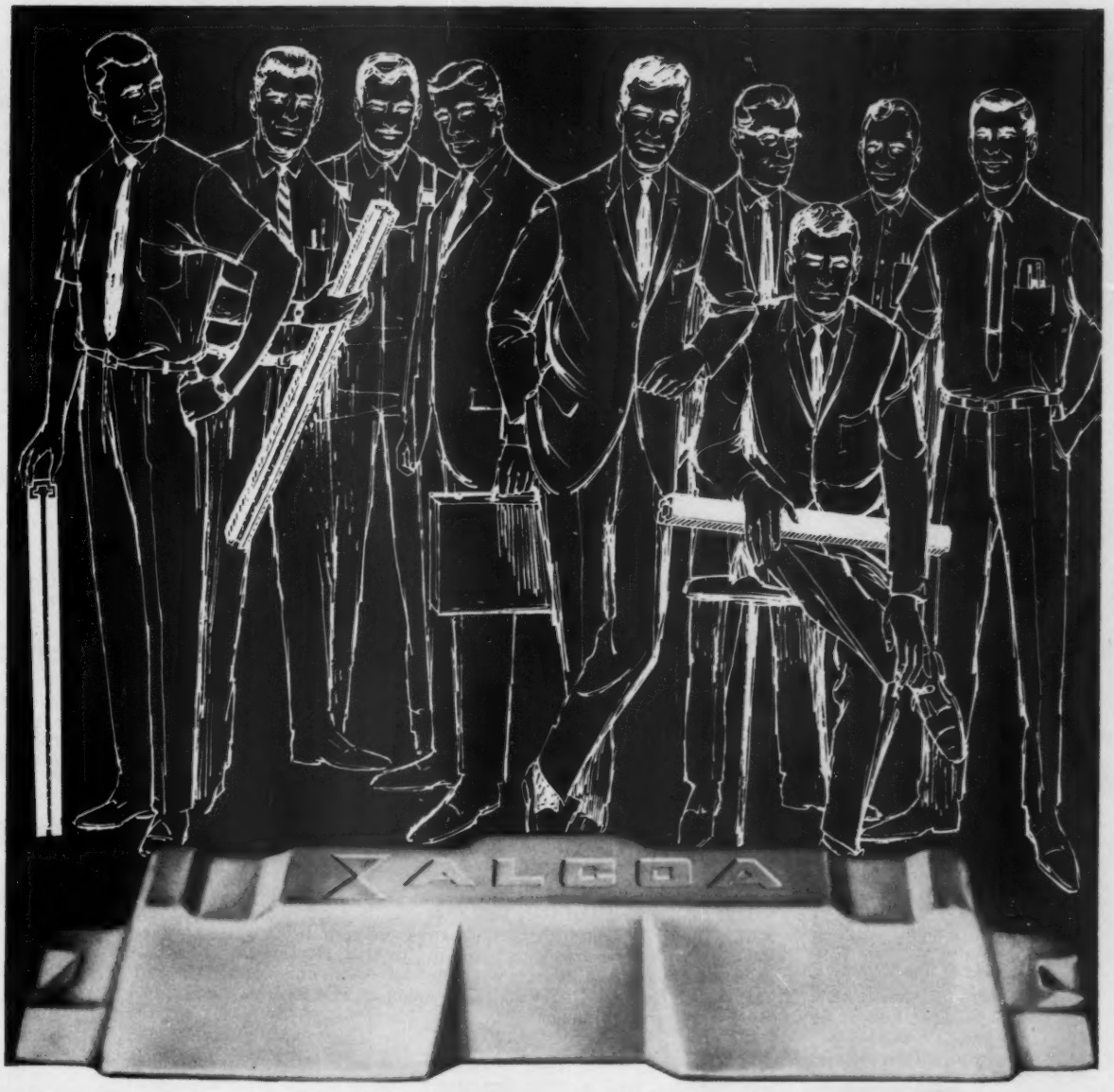
The combination of extensive daylight and adjustable down and return stroke adapted these presses for practically any trimming job. Soft, shearing hydraulic action assured clean trims without evidence of a rough, torn surface, which can give the appearance of porosity to a sound casting.

Since they were relatively lightweight, they were mounted on rolling bases to provide a mobility that is a definite advantage in scheduling these presses to their jobs. Because mounted presses are moved easily from place to place, it is practical to pair them, side by side, permitting one man to operate both presses. This practice allows the use of simple, single dies in each press to trim complex multiple-cavity castings economically. It is not necessary to lock their table wheels.



A view of the cleanly trimmed part. Note tooling and knockout feature on the press

A further advantage was realized with an unusual ram adapter that permits use of center-knockout-type dies in the hydraulic presses.



Nine Alcoa specialists travel 300,000 miles a year to help you solve aluminum extrusion and casting problems!

Users of Alcoa® Aluminum Ingot know they get the kind of quality that helps them speed up production, reduce waste . . . increase profits. They know, too, when problems arise, their Alcoa salesman will call in one of nine technical experts to help.

And these nine experts, with a total of 165 years' experience among them, are fully backed by thousands of Alcoa plant and research men. They know the answers when it comes to determining best extruding techniques, preparation of extrusions for finishing . . . how to control excess scrap, rejects, gating and risering of castings. They also start development work for new aluminum alloys to meet your special application problems.

Over 70 years' pioneering experience in the industry gives Alcoa a definite edge when it comes to know-how. And when *you* use Alcoa Ingot this know-how is available to you at no extra cost! Call your Alcoa salesman today for details. Or write: Aluminum Company of America, 863-J Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM

INGOT

For exciting drama watch "Alcoa Presents" every Tuesday evening—ABC-TV

Please send me FREE brochure on ☐ *Aluminum Extrusion Ingot* ☐ *Aluminum Casting Alloy Ingot*
863-J

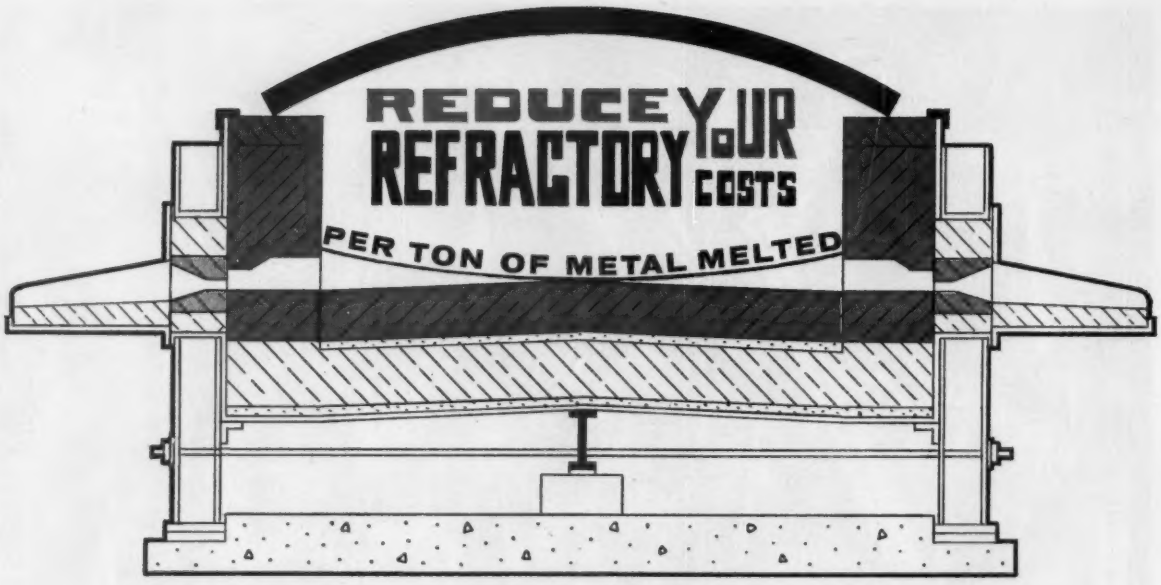
Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____



The reduction of refractory costs per ton of metal melted is a problem of chief concern to every operator of a malleable iron air furnace. To assist you in solving this problem, A. P. Green offers a complete line of high quality refractories for periodic and duplexing air furnace operations which provide low-cost, trouble-free service . . . your assurance against expensive production delays and frequent, off-schedule shutdowns.

1. BUNGS

Every air furnace has its trouble spots, and the bung arch is usually one of them. That's why A. P. Green BUNG brick were developed. They are super duty quality, combining high refractoriness with outstanding resistance to thermal and structural spalling . . . properties absolutely necessary for outstanding service in this critical area.

2. SIDEWALLS

A. P. Green sidewall brick have achieved an enviable reputation throughout the malleable industry for their dependability and economy. EMPIRE S.M., a dense, strong, high duty, de-aired stiff mud brick is used to meet the usual rugged requirements found in this area. However, where service is unusually severe, or in areas where excessive burn-out occurs, CLIPPER D.P. Super Duty, KRUZITE 70% Alumina, or KX-99 High Fired Super Duty brick are recommended.

3. BOTTOMS

A good bottom brick must balance several superior properties . . . high refractoriness, resistance to slag attack, the ability to withstand metal penetration, uniformity, lack of shrinkage, and good mechanical strength. A. P. Green offers several outstanding brick for bottom service . . . from CLIPPER D.P. Super Duty to 80 ALUMINA . . . with final recommendations based upon your specific operating conditions.

4. TAP OUTS

The tap out section of a melting furnace must be more dependable and fool-proof than any other part of the furnace construction. High quality tap outs are of vital importance to uninterrupted operation. For this reason A. P. Green has developed a special "tap-out mix" from highly refractory clays. In forming tap out shapes, a special process is used to provide maximum density and uniformity.

Avoid expensive production delays and shutdowns. Contact your local A. P. Green representative today for specific recommendations on how you can reduce your refractory costs per ton of metal melted.

A. P. Green REFRACTORY PRODUCTS

A. P. GREEN
FIRE BRICK COMPANY
MEXICO, MISSOURI U.S.A.

Plants: Mexico, Mo.—Woodbridge, N. J.—Sulphur Springs, Texas—Jackson, Oak Hill, South Webster, Ohio—Climax, Tarentum, Philadelphia, Pa.—Troy, Idaho—Pueblo, Colo.—Macon, Ga.—Birmingham, Ala.

In Canada: A. P. Green Fire Brick Company, Ltd., (Weston) Toronto, Ontario

LITERATURE for Foundrymen

For More Information, Use Reader Service Card—Page 39

Ultraviolet Spectrophotometer

Bulletin 779-B contains information on ultraviolet spectrophotometer. It explains optical system and operating principles of the double-beam instrument.—**Beckman Scientific & Process Instruments Div.**, 2500 Fullerton Rd., Fullerton, Calif.

For More Details Circle No. 410—Page 39

Blasting Abrasives

Special report explains pressure blasting and various manufactured abrasives used in its application. Charts and drawings are included.—Norton Co., Worcester 6, Mass.

For More Details Circle No. 411—Page 39

Steel Storage Equipment

Booklet documented by photographs and descriptions shows various kinds of steel storage equipment available to storage planners.—**Penco Div., Alan Wood Steel Co.**, Oaks, Pa.

For More Details Circle No. 412—Page 39

Overhead Cranes

Information on company's line of overhead handling equipment is featured in Bulletin 6-B. Illustrations and specifications are provided.—**Abell-Howe Co.**, 7747 Van Buren St., Forest Park, Ill.

For More Details Circle No. 413—Page 39

Roof Ventilators

Bulletin A-112E gives details, specifications, dimensions, and performance data on propeller fan-powered roof ventilators and stack caps.—**Hartzell Propeller Fan Co.**, Piqua, Ohio.

For More Details Circle No. 414—Page 39

High-Pressure Hose Fittings

Bulletin 651 lists specification data for high-pressure hose fittings, including wire braid, straight, elbow and split-flange types.—**Aeroquip Corp.**, Jackson, Mich.

For More Details Circle No. 415—Page 39

Mold Ovens

Bulletin 806 illustrates and describes mold ovens with intermittent roller conveyors, continuous flight conveyors, and flat deck or skeleton car systems.—**Foundry Equipment Co.**, 1831 Columbus Rd., Cleveland 13, Ohio.

For More Details Circle No. 416—Page 39

Copper-Lithium Alloys

Annotated bibliography contains abstracts of all published literature on copper-lithium alloys. It covers physical and chemical properties, uses, analysis, and preparation.—**Foote Mineral Co.**, 18 W. Chelten Ave., Philadelphia 44, Pa.

For More Details Circle No. 417—Page 39

Level Control Systems

Booklet discusses tank and bin level control systems based on nuclear radiation, for liquids and solids. Source and detector unit specifications are included.—**Industrial Nucleonics Corp.**, 650 Ackerman Rd., Columbus 2, Ohio.

For More Details Circle No. 418—Page 39

Covering and Refining Fluxes

Technical leaflet A-9 describes properties of covering and refining fluxes for melting copper-and-nickel-alloy scrap. It contains instructions for use in crucible, reverberatory and rotary furnaces and lists grades for various applications.—**Foseco Inc.**, P. O. Box 8728, Cleveland 35, Ohio.

For More Details Circle No. 419—Page 39

Did You Miss These?

Here is a list of popular literature items offered in recent months:

PYROMETER — Shaw Instrument Corp., Latrobe, Pa. Circle 402, Page 39.

OLIVINE AGGREGATE (Bulletin 60-2)—Northwest Olivine Co., Seattle 1, Wash. Circle 403, Page 39.

VACUUM MELTING (Bulletin 4-25)—Consolidated Vacuum Corp., Rochester 3, N. Y. Circle 404, Page 39.

ALUMINUM DEGASSING (Leaflet B2)—Foseco Inc., Cleveland 35, Ohio. Circle 405, Page 39.

CERIUM IN DUCTILE IRON—Cerium Metals & Alloys Div., Ronson Metals Corp., Newark 5, N. J. Circle 406, Page 39.

ZINC CASTING QUALITY (*Asarco Non-Ferrous Metals Digest*, Vol. 2, No. 2)—American Smelting & Refining Co., New York 5, N. Y. Circle 407, Page 39.

GRAY IRON INOCULANT—Vanadium Corp. of America, New York 17, N. Y. Circle 408, Page 39.

Consulting Engineers

Bulletin 116 describes company's construction management services, including site selection and development and design and plant engineering.—**Lester B. Knight & Associates Inc.**, 549 W. Randolph St., Chicago 6, Ill.

For More Details Circle No. 420—Page 39

Grizzly Feeders

Catalog 610 lists details on vibrating, pan-type feeders and grizzly feeders.—Simplicity Engineering Co., Durand 2, Mich.

For More Details Circle No. 421—Page 39

Scrubbers

Catalog 150 describes features and lists dimensions and capacities of gas scrubbers.—W. W. Sly Mfg. Co., 4700 Train Ave., Cleveland 1, Ohio.

For More Details Circle No. 422—Page 39

Laboratory Heating Apparatus

Catalog 92 describes heating apparatus for laboratory use. Pyrometric sticks, pellets and lacquers, heating jackets, and heating tapes also are covered.—**Burrell Corp.**, 2223 Fifth Ave., Pittsburgh 19, Pa.

For More Details Circle No. 423—Page 39

Hardness Tester

Literature describes portable hardness tester that meets ASTM standards for Brinell test.—**Blosjo Enterprises**, 222 Washington St., Anoka, Minn.

For More Details Circle No. 424—Page 39

Diecasting Machines

Bulletin 461 illustrates and describes high-pressure diecasting machines available as either hot or cold chamber models.—**Cleveland Automatic Machine Co.**, 4932 Beech St., Cincinnati, Ohio.

For More Details Circle No. 425—Page 39

Aluminum Melting Refractories

Booklet discusses regular and super refractories for use in aluminum melting furnaces. It also covers specifications and performance characteristics.—**Kaiser Refractories & Chemical Div., Kaiser Aluminum & Chemical Sales Inc.**, Kaiser Center, 300 Lakeside Dr., Oakland, Calif.

For More Details Circle No. 426—Page 39

Load Cell Systems

Engineering manual illustrates and describes remote indicating load cell systems and their applications. Dimensions

Indianapolis Foundry Coke

Standard of the Industry

Its high carbon content . . . low sulphur . . . low ash and uniform carbon absorption . . . its carefully controlled structure and sizing . . . all combined to produce a coke of unsurpassed quality. Indianapolis coke gives maximum metal temperature with minimum coke per charge.

Always **HIGHEST QUALITY**

Always **CLOSE SIZING**

Always **PROMPT SHIPMENTS**

Always **"H-W" SERVICE**

70 Years of Service to American Foundrymen

Hickman, Williams & Company

CHICAGO • DETROIT • CINCINNATI • ST. LOUIS • NEW YORK
CLEVELAND • PHILADELPHIA • PITTSBURGH • INDIANAPOLIS • ATLANTA
Established 1890

and price lists for standard models and accessories are included.—**W. C. Dillon & Co. Inc.**, 14620 Keswick St., Van Nuys, Calif.

For More Details Circle No. 427—Page 39

Front End Loaders

"Do More Jobs . . . Easier" is a booklet which describes company's line of front end loaders under working conditions.—**Caterpillar Tractor Co.**, Peoria, Ill.

For More Details Circle No. 428—Page 39

Flasks

Illustrated brochure explains features of line of foundry flasks and other related equipment. —**Foundry Flask & Equipment Co.**, 455 E. Cady St., Northville, Mich.

For More Details Circle No. 429—Page 39

Pneumatic Products

Catalog No. 1000 contains 64 pages describing pneumatic products such as compressed air line filters, pressure regulators,

air line lubricators, and valves. Charts of information about compressed air flow and moisture content of saturated compressed air are included.—**C. A. Norgren Co.**, 3400 S. Elati St., Englewood, Colo.

For More Details Circle No. 430—Page 39

Dye Penetrant Inspection

Folder describes spray-on dye penetrant inspection. Illustrations show procedure for use in various applications.—**Magnaflux Corp.**, 7301 W. Ainslie Ave., Chicago 31, Ill.

For More Details Circle No. 431—Page 39

Grinders and Buffers

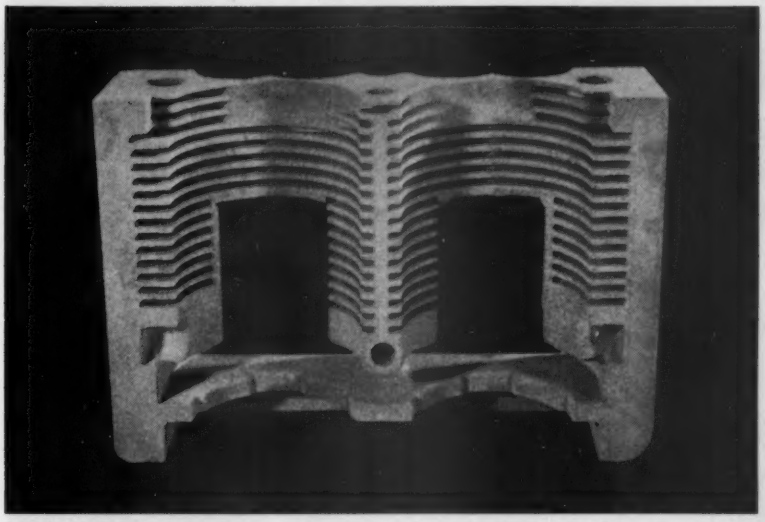
Bulletin describes grinders and buffers, built-in dust collector units, and accessories.—**United States Electrical Tool Co.**, 3640 Llewellyn St., Cincinnati 23, Ohio.

For More Details Circle No. 432—Page 39

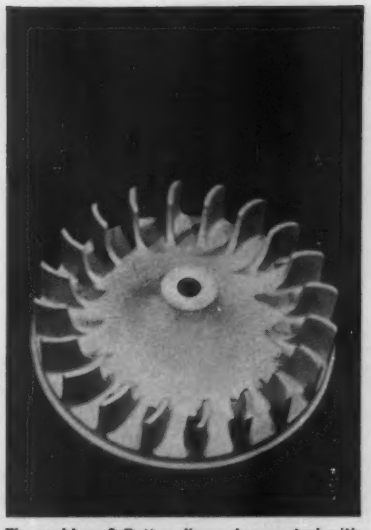
Bag-Type Dust Arresters

Bulletin 164-6 supplies design, assembly, construction and operation data for automatic bag-type dust arresters. Tables of

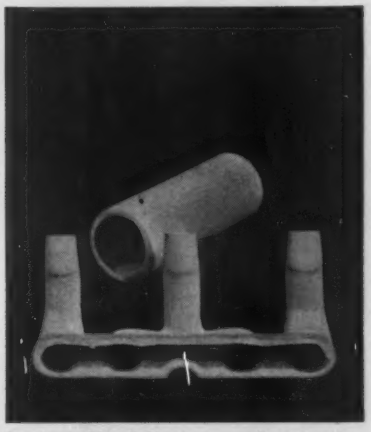
Are shapes like these giving you trouble?



Need fine detail? Shell process eliminates most of the problems involved in producing this cheek core, used between cylinder block and valve chambers in an air-cooled engine. Cleaner passageways result in freer circulation around the engine.



Fin problems? Better dimension control with shell molds gives flywheel for an air-cooled engine better balancing characteristics.



Breakage blues? Breakage savings are tremendous on this intake and exhaust port core (foreground) and cylinder core (background). Cores can be stacked for storage, held ready for rush orders.

Here's how one foundry solves them

No doubt about it, these shapes are intricate—with their fins, fine details, and precision tolerances.

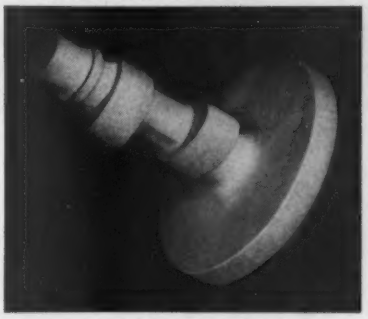
But the Berlin-Chapman Foundry of Berlin, Wis., makes them in huge quantities, with a minimum of down time.

The reason is no secret. Hundreds of progressive foundries have discovered the multiple advantages of shell molds and cores bonded with Durez® foundry resins.

Berlin-Chapman cuts machining 64% on one casting alone. For a cam and gear part used in an air-cooled engine, production of the castings with shell cores greatly improved handling ease, quality, and efficiency.

It was formerly made with a green sand core. Converted to shell, the core is nearly two-thirds lighter, facilitating handling and reducing breakage. Because casting quality is improved, most of the final machining is eliminated.

How much machining? Final machining was cut 64% on these cam and gear castings with shell process. Over 12½ million of these castings have been made.



Harold Warner, vice president and manager of foundry operations at Berlin-Chapman, credits Durez resins as a contributing factor in the success of their shell molding and shell core operations. Says Mr. Warner: "These resins and the service we have received from Durez have provided tremendous savings on sand coating. Durez resins mull up easily and don't require an additional catalyst." He estimates the company has been able to increase capacity four times on the castings switched to shell.

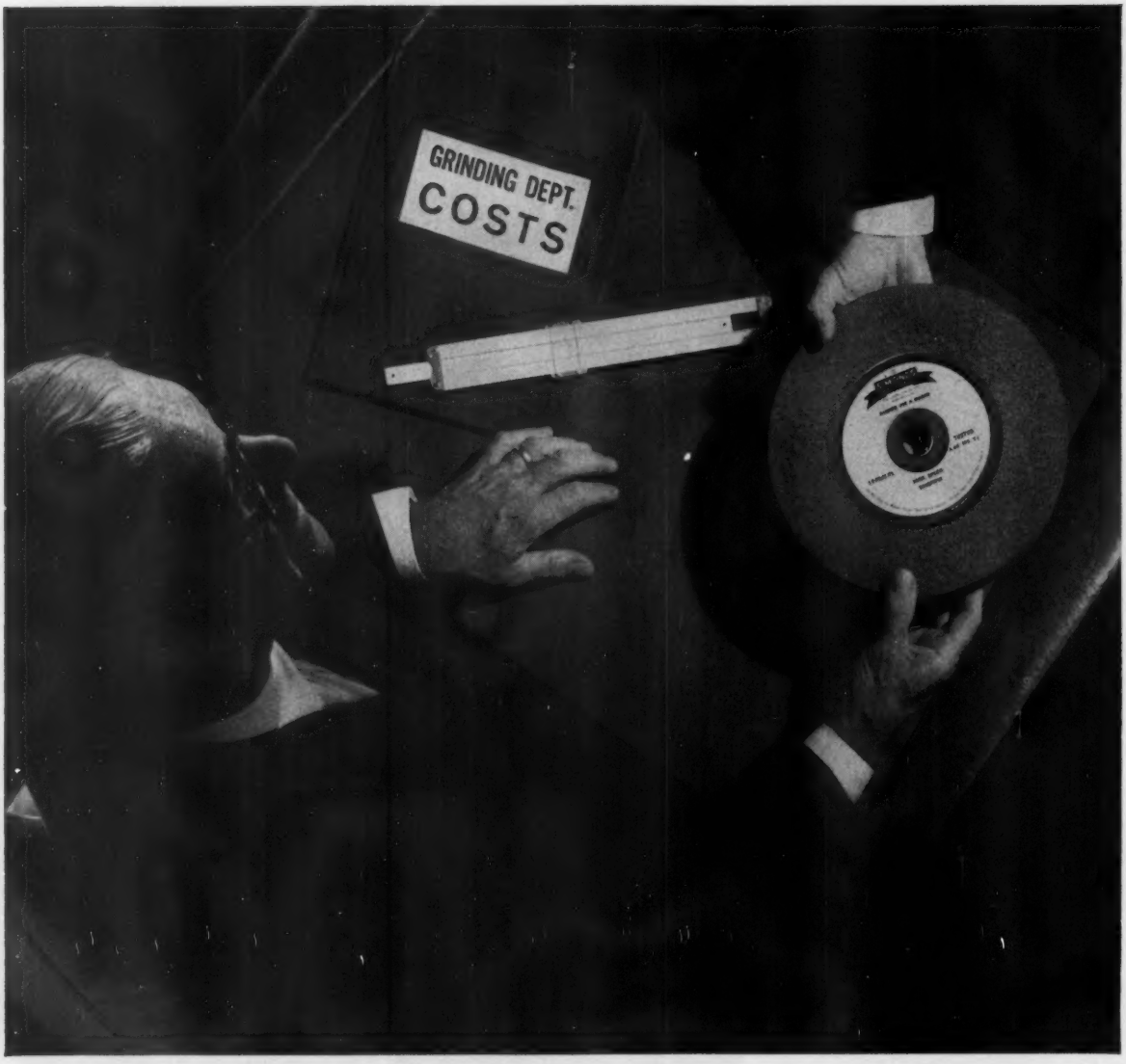
Can shell molds and cores help your foundry show results like these, too? Your Durez representative can help you decide. Drop us a note, and we'll gladly have him call on you.

Helpful booklet 32-page "Guide to Shell Molding" contains recommendations on patterns, mixing, temperatures, lubricants, molds, cores. Written by men who have worked with shell molding for years. Write for a free copy today.

DUREZ PLASTICS DIVISION

HOOKER CHEMICAL CORPORATION, 1009 WALCK ROAD, NORTH TONAWANDA, N. Y.

HOOKER CHEMICALS PLASTICS



An important cost ratio . . . and how to improve it

Wheel life to wheel output! With that ratio right, you save machine and operator time . . . cut rejects. And that's where Simonds can help you. How? With grinding wheels that head into the work with a bite that keeps biting . . . wheels with speed and stamina to make fast, efficient work of the toughest, hardest metals . . . wheels that save set-up time by often eliminating the need for wheel change when switching operations . . . wheels your Simonds distributor can supply in specifications that give you that essential, cost-cutting ratio between performance and production. Send for illustrated catalog now.

SIMONDS ABRASIVE CO.
PHILADELPHIA 37, PENNA.
DIVISION OF SIMONDS SAW AND STEEL CO.

your "buy-pass" for better grinding
CALL YOUR SIMONDS DISTRIBUTOR
helping YOUR business is HIS business

WEST COAST PLANT: EL MONTE, CALIF. — BRANCHES: CHICAGO • DETROIT • LOS ANGELES • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO SHREVEPORT — IN CANADA: GRINDING WHEELS DIVISION, SIMONDS CANADA SAW CO., LTD., BROCKVILLE, ONTARIO • ABRASIVE PLANT, ARVIDA, QUEBEC

dimensions and capacities are included.—**Northern Blower Div., Buell Engineering Co. Inc.**, 6409 Barberton Ave., Cleveland 2, Ohio.

For More Details Circle No. 433—Page 39

Recorders and Controllers

Specification sheets cover circular chart, strip chart, circular scale, and indicator controllers and recorders.—**Minneapolis-Honeywell Regulator Co.**, Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.

For More Details Circle No. 434—Page 39

Electrolytic Polishing

Issue No. 3, Vol. VII, *Metal Digest*, features details and specifications on electrolytic polishing and etching.—**Buehler Ltd.**, 2120 Greenwood St., Evanston, Ill.

For More Details Circle No. 435—Page 39

Core Oil Polymers

Booklet No. 505-5 illustrates line of polymers available for use as low-cost extenders in core oils.—**Velsicol Chemical Corp.**, 330 E. Grand Ave., Chicago 11, Ill.

For More Details Circle No. 436—Page 39

Spiral Bevel Speed Reducers

Bulletin J-25 illustrates and describes horizontal and vertical spiral bevel speed reducers. It gives application and capacity data.—Dept. SR, **Hewitt-Robins**, Stamford, Conn.

For More Details Circle No. 437—Page 39

Heat Processing Equipment

Booklet illustrates and describes applications of company's heat processing equipment of various kinds in a number of industries, including metalcasting. Pictures and diagrams supplement the text.—**Lanly Co.**, Cleveland, Ohio.

For More Details Circle No. 438—Page 39

Water-Cooled Compressors

Bulletin contains information on six-stage, single casing, water-cooled centrifugal compressors. It gives dimension and performance data.—**Allis-Chalmers**, Milwaukee 1, Wis.

For More Details Circle No. 439—Page 39

Thermocouple Materials

Catalog 2550 discusses mineral oxide insulated thermocouple materials. The booklet also provides reproducibility standards and chemical specifications.—**Temptron Inc.**, 7030 Darby Ave., Reseda, Calif.

For More Details Circle No. 440—Page 39

Lift Truck Rental

Booklet called "Which Is Best for You?" explains facts about the leasing and renting of automatic lift trucks; supplement gives prevailing rates.—**Automatic Transportation Co.**, 149 W. 87th St., Chicago 20, Ill.

For More Details Circle No. 441—Page 39

Let us help you CUT COSTS

AT THE CUPOLA SUPERFLUX gives faster melting, less scrap, cleaner drops. Our CARBON BRICKS, SF-300, let you use more scrap, and less pig iron.

AT THE FOREHEARTH SF-200, High Alumina RAMMING MIX, cuts relining costs.

AT THE ALLOYING LADLE Ductile iron makers swear by LADLE FLUX SF-100.

AT THE ELECTRIC FURNACE Lower costs per ton of melt with our SF-220 PATCH and our SF-250 CASTABLE.

SUPERFLUX®

Briquetted Cupola Flux

SUPERFLUX MFG. CO.

16125 Cleophus Pkwy. Allen Park, Michigan

SALES AGENTS

MILLER & COMPANY Chicago Cincinnati St. Louis
HICKMAN, WILLIAMS & CO. Philadelphia New York Cleveland Pittsburgh
J. D. WILSON DIV., Milwaukee L. C. REFRACTORIES, Muskegon

For More Information Circle 672, Page 39

NOMAD EQUIPMENT

pays off again!

Nomad's Double Level Track helped this foundry* increase volume, reduce costs and manpower!

Molds are handled on 17" x 96" pallets.

Write for literature TODAY!

**Inter-State Foundry Co. Indianapolis, Ind.*

NOMAD EQUIPMENT

NOMAD EQUIPMENT CORPORATION

3110 W. FOND DU LAC AVE. • MILWAUKEE 10, WIS.

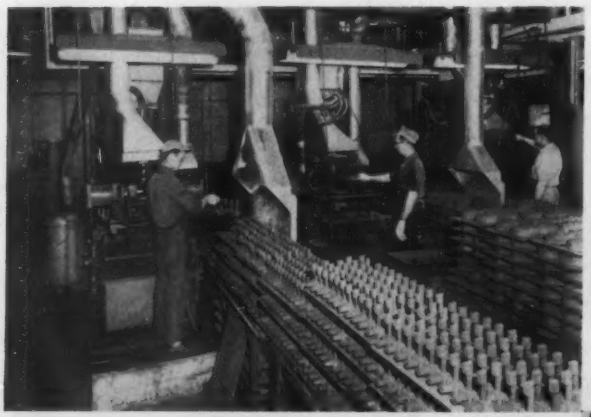
DESIGNERS and MANUFACTURERS of COMPLETE CONVEYOR SYSTEMS

For More Information Circle 673, Page 39

foundries cut costs and save

SHELL SAND-COATING, MOLDING & CORE MACHINERY

ENGINEERED AND BUILT BY C&S

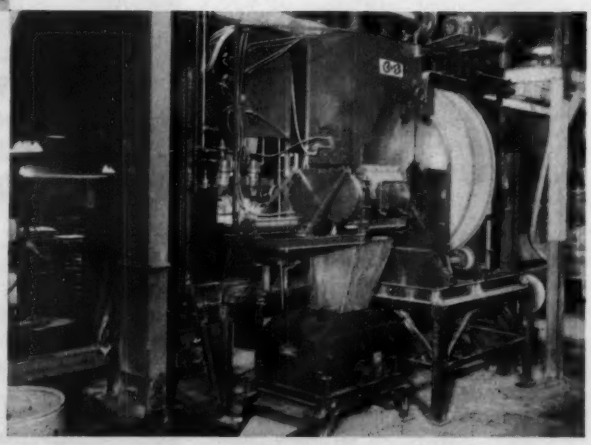


"BLO-CORE"

2-Station Automatic Shell Machine. Used for shell molds and shell cores with either horizontally or vertically parted boxes . . . gas or electrically heated. Maximum cores: 15"x 20" . . . molds 20"x 26"

"MIXALL"

A Complete-Package Automatic or Manual Shell Sand-Coating Plant. There's a model to fit your operation exactly: 200 lb. to 2,000 lb. sand batch capacity on a 4-minute cycle.



Write today for detailed bulletins on C&S Equipment

from uncoated sand to finished shell molds or cores

more with . . .

C&S

AFFILIATED WITH Barber-Greene

CONVEYORS & BULK MATERIAL HANDLING EQUIPMENT

FOR FOUNDRY SANDS, COKE & LIMESTONE, ETC.!

above: HOPPER CAR UNLOADER & PORTABLE CONVEYOR

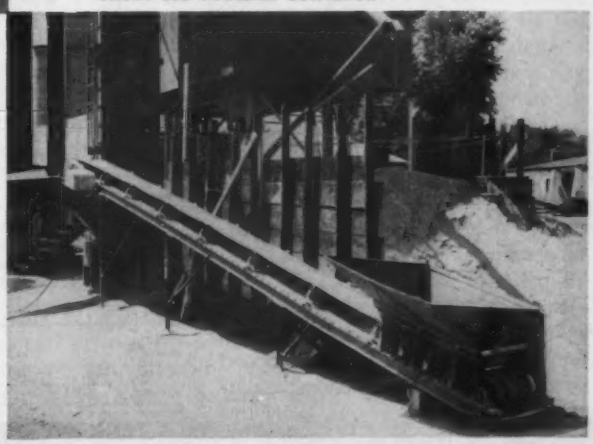
Now C&S offers a FULL LINE of PRE-ENGINEERED Conveyors, accessories and conveyor components . . . all built to standard specifications for maximum quality at minimum cost. Stocked for prompt shipment.

for **NEW INSTALLATIONS**
ALTERATIONS
MAINTENANCE

BELT IDLERS & RETURN ROLLERS

All Sizes & Types for New Installations or Maintenance Replacements, built to conveyor manufacturers' standards in both lubricated and perma-greased types. Available for light, normal, and heavy duty applications.

below: C&S TRANSFER CONVEYOR



"Engineers & Builders of Automatic Foundry Equipment"

C&S PRODUCTS COMPANY, INC. *Now located at:* BARBER-GREENE ROAD
DEKALB, ILLINOIS, U. S. A.

Planned Annual Maintenance of

AIR SYSTEMS

Pays Dividends

By ADOLPH G. RINGER
Assistant Manager
Pneumatic & Electric Tool Div.
Ingersoll-Rand Co., New York

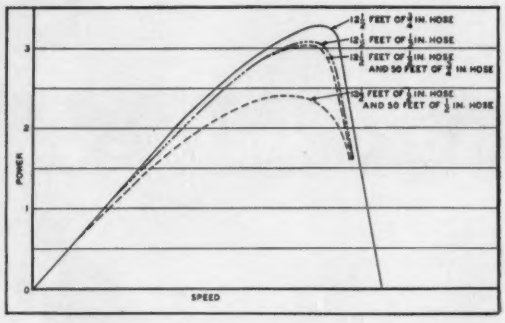

12½ FEET OF ¼ IN. HOSE
12½ FEET OF ½ IN. HOSE
12½ FEET OF ½ IN. HOSE AND 50 FEET OF ¼ IN. HOSE
12½ FEET OF ½ IN. HOSE AND 50 FEET OF ½ IN. HOSE
POWER
SPEED
0
1
2
3

Fig. 1—Curves show the influence of various hose combinations on the power of a grinder

● AIR POWER is indispensable in modern foundries. As a result, productivity is lowered by worn or improperly operating air tools, hoists, or cylinders; leaky air lines; undersized fittings; or other inadequate equipment. An annual program to remedy these faults pays dividends.

One jobbing foundry, Malleable Iron Fittings Co., Branford, Conn., decided to find out what could be done to improve its air system. Air engineers from Ingersoll-Rand Co. were called to analyze the foundry's compressed air system and its air tool operations. The analysis and corrective action taken by this New England foundry show the savings possible with a twofold program: 1. A planned annual review of foundry compressed air systems. 2. Planned annual retooling or replacement of inefficient and worn out air tools.

Analysis—First step in any analysis of air tool operation is to check the compressor and the piping system delivering the air to each station. The newest, most efficient air-operated devices are only as effective as the power that drives them. A brand new tool, designed to operate at 90 psi, produces only 73 per cent of its rated output at 70 psi.

In general, this foundry's air system was excellent, with proper-sized piping, all connections taken off the tops of the mains, moisture removed by proper aftercooling of the compressed air, and an adequate number of lubricators. Moreover, the compressors were delivering a good supply of clean, dry air at 90 psi to all stations in the foundry.

Tests showed, however, that this air was not getting to the tools. Needle gages inserted in hoses near the tools registered as low as 70 psi.

The cleaning room air pressure was 90 psi at the downcomer from the main. At Cleaning Station 4A, however, a size 0 grinder was operating at 84 psi because of undersized fittings. A size 2C1S72 grinder was operating at 82 psi because the ½-in. hose was reduced by ¼-in. fittings and had been mended five times. A size 3S60 grinder was operating at 70 psi because of ¼-in. fittings and a hose which had been mended in six places. Pressure before the first mend was 87 psi. The size 4 chipping hammer was supplied by a hose mended in three places.

At Cleaning Station 2A, a size 0 grinder was operating at 86 psi because its hose had been mended in three places. A size 2E5 grinder was operating at 75 psi because of ¼-in. fittings and a hose mended in five places. A size 3 grinder was operating at 77 psi because its ½-in. hose was reduced by ¼-in. fittings and the hose was mended in two places. The size 200 chipping

TABLE I—Hose Arrangements for Air Tools

Air Flow Cubic Feet Per Minute	25′ of ¼″ Hose	6′ of ½″ Hose	25′ of ¼″ Hose	12½′ of ½″ Hose	25′ of ½″ Hose	25′ of ½″ Hose	12½′ of ¾″ Hose	25′ of ¾″ Hose	25′ of 1″ Hose	25′ of ¼″ Hose + 25′ of ½″ Hose	25′ of ¼″ Hose + 50′ of ½″ Hose	25′ of ½″ Hose + 25′ of ½″ Hose	25′ of ½″ Hose + 50′ of ½″ Hose	25′ of ½″ Hose + 25′ of ¾″ Hose	25′ of ½″ Hose + 50′ of ¾″ Hose
	Pressure Drop—Pounds per Sq. In.—Based on 100 Pounds per Sq. In. Line Pressure														
10 to 11	5.0	.9								5.3	.7	1.4			
11 to 12	5.9	1.0								6.3	.8	1.6			
12 to 13	6.8	1.2	.4							7.2	.9	1.9			
13 to 14	8.0	1.4	.5							8.4	1.1	2.2			
14 to 15	9.2	1.6	.6							9.8	1.3	2.5			
15 to 16	11.0	1.9	.7							11.6	1.5	2.9			
16 to 18	14.0	2.4	.8							15.0	1.9	3.5	1.7		
18 to 20	19.6	3.0	1.0							21.4	2.4	4.5	2.0		
20 to 25		4.3	1.4	.7	1.0	1.3					3.5	6.4	2.6	1.3	
25 to 30		6.5	2.1	1.0	1.5	2.3					5.2	9.8	3.8	1.9	
30 to 35		9.5	3.1	1.3	2.1	3.4					7.3	13.7	5.3	2.6	
35 to 40		13.3	4.3	1.7	2.8	5.3					9.6	18.4	7.1	3.5	
40 to 50		19.5	6.3	2.4	4.1	8.0					14.0		10.4	5.2	1.8
50 to 60			9.6	3.7	6.3	12.2					21.5		16.0	7.8	2.3
60 to 70			13.8	5.3	9.0	17.4	.9	1.4	1.9				22.6	11.1	3.0
70 to 80			18.7	7.1	12.4		1.1	1.7	2.5					15.0	3.7
80 to 90			25.0	9.0	16.1		1.4	2.2	3.2					19.8	4.6
90 to 100				11.3			1.7	2.7	4.0						5.8
100 to 120							2.3	3.5	5.6						7.9
120 to 140							3.3	4.8	8.0						11.2
140 to 160							4.3	6.6	11.0						15.5
160 to 180							5.6	8.7	15.2						20.4
180 to 200							7.2	11.0							
200 to 220							9.0								

Yes! Progressive Foundries Prefer WHIRL-AIR-FLOW Pneumatic Sand Conveyors

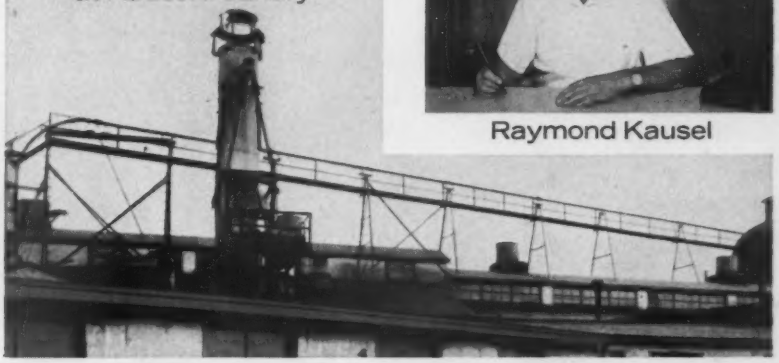
Charles Kausel

Raymond Kausel

Charles and Raymond Kausel, owners of the successful Kausel Foundry Co., Minneapolis, give these reasons why they are using Whirl-Air-Flow:

- **Lower first cost**
- **Greater layout flexibility**
- **More efficiency**
- **Cleaner operation**
- **Lower maintenance**

Shakeout sand system at Kausel Foundry



Here are the three pneumatic systems that complete mechanization at the Kausel foundry:

A

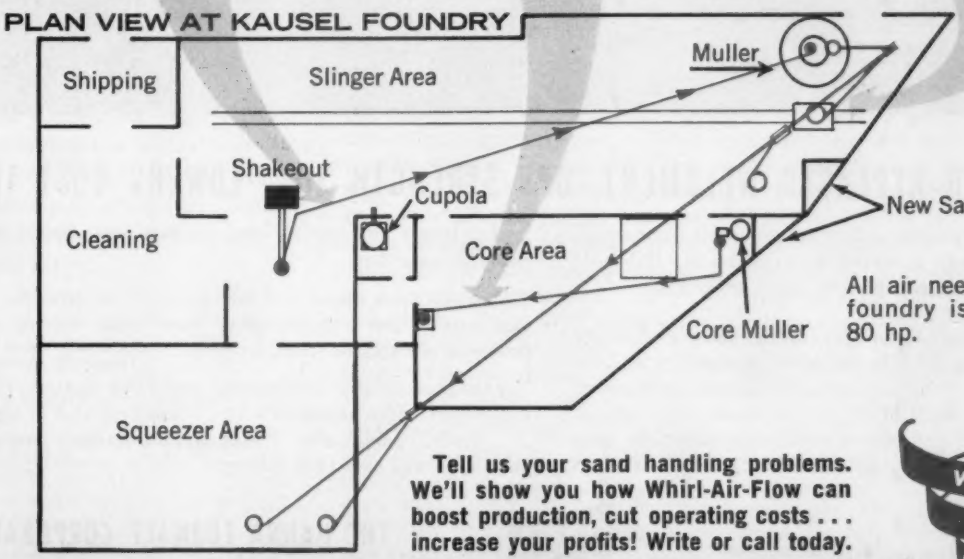
Shakeout sand transported 200 feet to storage over muller. Rate of transport is 35 tons per hour. Has been in operation three years with **only three pipe sections replaced!**

B

Core sand transported 90 feet to central core room hopper. Has been operated two and one-half years with **no pipe replacement!**

C

New molding sand delivery to slinger hopper and four molders stations. Is final step in this program . . . shows practicality of step-by-step Whirl-Air-Flow installation!



All air needed at Kausel foundry is supplied by 80 hp.

Tell us your sand handling problems. We'll show you how Whirl-Air-Flow can boost production, cut operating costs . . . increase your profits! Write or call today.

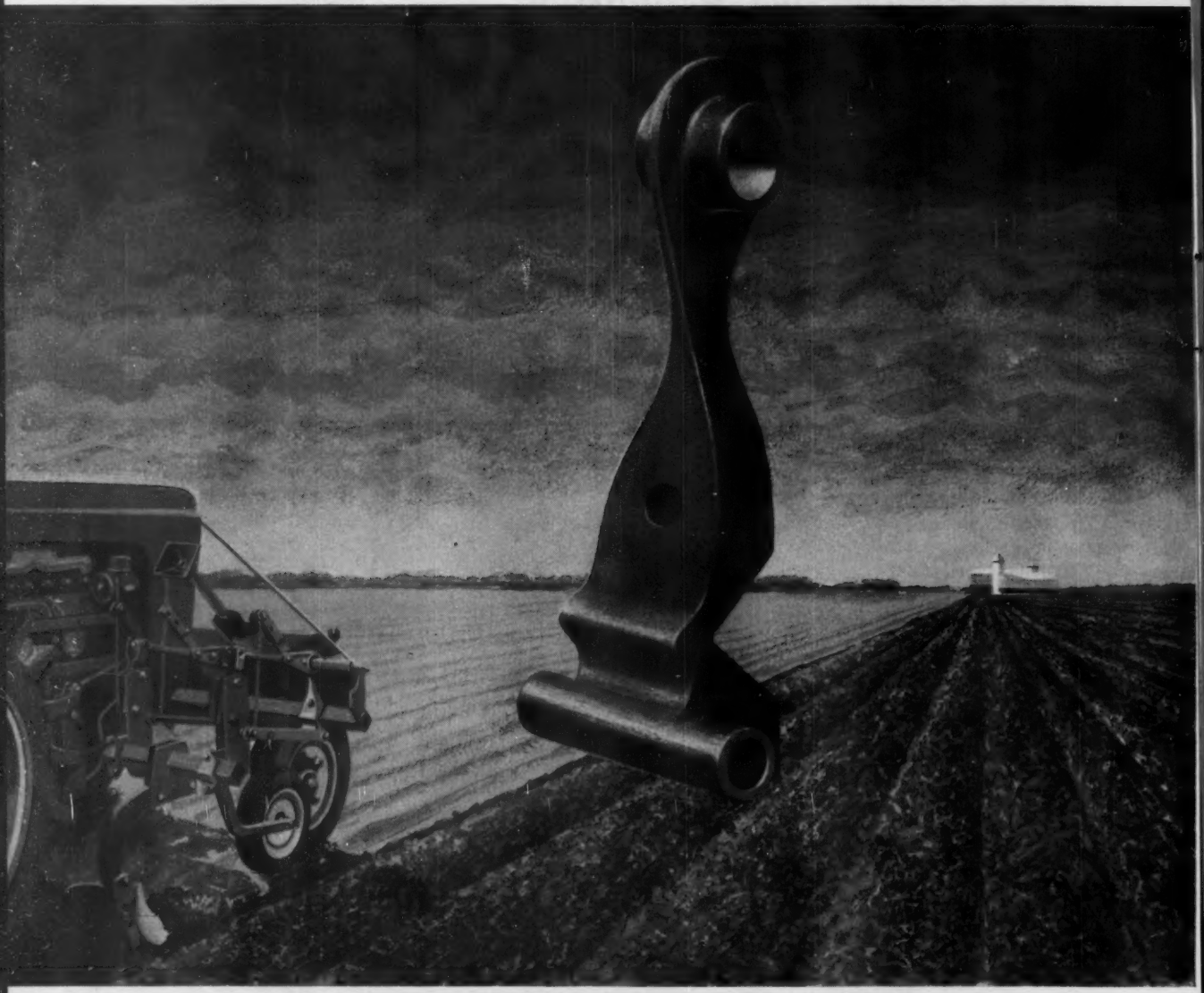
WHIRL AIR FLOW PNEUMATIC CONVEYORS

WHIRL-AIR-FLOW

650 - 25th Avenue S.E., Minneapolis 14, Minn. • FEderal 9-0231

For More Information Circle 675, Page 39

How the Foundry Industry Serves America . . . #18 of a Series



IRON CASTING REPLACES WELDMENT, UPS STRENGTH 20%, LOWERS COST 11.1%

Used to connect cultivators to farm tractors, this front standard arm was formerly produced as a weldment. But poor wearing qualities and breakage were major problems.

By redesigning the part to an iron casting, the manufacturer increased part strength 20%, improved wearability and received an 11.1% cost reduction bonus. Annual savings mounted to approximately $7,000! Much of this came from reduced tooling costs—ten of the twelve machining operations were eliminated by the switch to an iron casting. In addition to lasting longer and costing less, the part looks better and is easier to assemble.

This is one more example of how versatile, modern iron castings can reduce manufacturing costs while solving other problems of industrial design.

For the production of structurally sound iron castings, Hanna Furnace provides foundries with all regular grades of pig iron . . . foundry, malleable, Bessemer, intermediate low phosphorus, as well as Hanna Silvery.

Facts from files of Gray Iron Founders' Society, Inc.

HANNA
THE BEST KNOWN NAME IN IRON

THE HANNA FURNACE CORPORATION

Boston • Buffalo • Chicago • Detroit
New York • Philadelphia

Hanna Furnace is a division of **NATIONAL STEEL CORPORATION**

For More Information Circle 676, Page 39

In the interest of the American foundry industry, this series of ads also appears in

STEEL
IRON AGE
MODERN CASTINGS
AMERICAN METAL MARKET

FREE!

REPRINTS OF THIS AD WITH YOUR FIRM'S SIGNATURE

If you would like to have reprints of this ad to mail to your customers and prospects, let us know. Reprints will have no Hanna product message or signature, but will be imprinted with your firm name and address. Absolutely no obligation. To order your reprints, fill in and mail the coupon below.

The Hanna Furnace Corporation
Detroit 29, Michigan

Please send me_____reprints of Ad No.
(No.)

____of your Foundry Industry Series.
Imprint as follows:

_____

_____

_____

Send reprints to:

NAME_____

I understand there is no charge for this service.

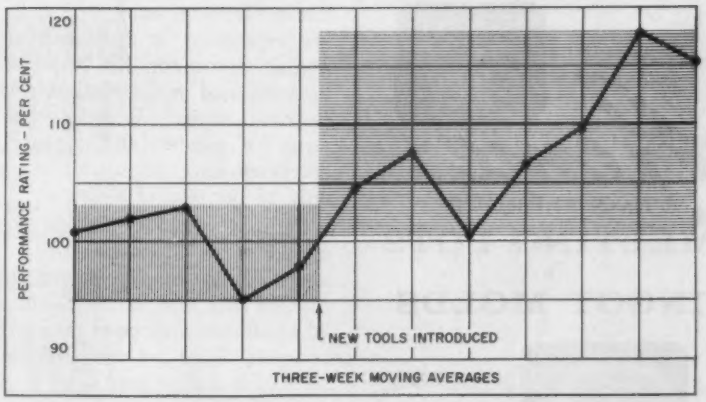


Fig. 2—Performance ratings before and after installation of new tools are plotted here using three-week running averages

hammer used a 40-ft hose leader.

The best hose mender causes a pressure drop of 1 to 1.5 psi per mend, and the common practice of mending ½-in. hose with ¼-in. pipe nipples causes a pressure drop of 3 to 4 psi per mend. Accordingly, a hose which has been mended three to five times cuts pressure at the tool to 70 to 80 psi rather than the 90 psi delivered to the station by the foundry mains.

Long lengths of undersized hose can seriously handicap even a new tool. Fig. 1 shows the influence of various hose combinations on the power of a grinder. The power of an air tool can be reduced by 25 per cent by the use of 50 ft of ½-in. hose instead of ¾-in. hose.

Table I indicates the proper hose arrangements for any air tool. Hose combinations with pressure drops below bottom black lines in each column are not recommended under any circumstances. When combinations in the enclosed areas are used, no more than one repair should be allowed in the hose because additional line losses would cause serious reduction of over-all power output by the tool.

Replacing Tools — The analysis indicated that air tools in the foundry cleaning room were operating at far below peak efficiency. Much of this efficiency was recoverable by proper sizing of hoses and fittings. Many of the tools, however, were old and worn beyond repair. To bring the chipping station operations up to peak efficiency and to keep them there, a planned annual tool replacement program was recommended.

Unfortunately, drop-off in efficiency as air tools become worn often is hidden from even the most alert foundry management. As tool efficiency drops off, quality may suffer slightly, and the worker may find shortcuts, so that production suffers only a little. Individually, these changes are hard to pin down, but cumulatively they are significant.

Regardless of the type or make of tools used, efficiency drops 5 to 25 per cent each year, under normal usage. Higher or lower than normal use increases or decreases the rate of wear, respectively. The important factor is not actual tool efficiency loss, but what this loss represents in reduced operator efficiency. In the hands of a $5000-a-year operator, a 5 per cent annual drop in tool efficiency can represent a loss of $1250 by the fifth year.

The method used to analyze the annual retooling rate recommended for cleaning room stations at Malleable Iron is applicable to practically any foundry utilizing portable air tools. At that company, each of seven cleaning stations is equipped with four air tools—three grinders and one chipping hammer—and each operator uses air tools about 90 per cent of a working day. Use of any given tool varies slightly from station to station, but each is used approximately 25 per cent of the time.

Annual tool replacement costs must be calculated separately for grinders and chippers because rotary tools have longer life expectancy than percussion tools. Under normal use—50 per cent of each working day—grinders have a max-

Acme

NON-FERROUS

MELTING POTS

•

INGOT MOLDS

Special Alloy

EXTENDS LIFE . . . NO HOT SPOTS!

Acme melting pots and ingot molds assure even heat distribution without hot spots . . . they improve non-ferrous casting quality and put a damper on rejects. Cast of a specially-developed iron alloy, Acme pots and molds provide great strength and unusual resistance to high temperatures, too. As a result they consistently reduce down time and substantially cut replacement costs.

Stocked in forty sizes and a complete range of styles, you can standardize on Acme melting pots and molds and be confident of immediate shipment at all times! Take advantage of all these benefits . . . proven over a period of more than 30 years.

FORTY SIZES IN STOCK

Quick delivery anywhere in the United States eliminates your "stand-by" non-ferrous pot and mold inventory. Write for bulletin listing all sizes and styles.

Acme

FOUNDRY CO.

2502 22nd St., DETROIT 16, MICHIGAN

Phone TA 5-2404

For More Information Circle 677, Page 39

imum life of 4 years, and chipper life expectancy is only half that. Actual maximum life expectancy for tools used in the Malleable Iron cleaning stations is twice this—8 years for grinders and 4 years for chippers—since each unit is used only 25 per cent of a day.

Perhaps some explanation is required as to life expectancy. An air tool is considered to have reached the end of its useful life when efficiency drops to 50 per cent or lower. Since lost efficiency in an air tool is due to part wear, it generally is more expensive to repair an extensively worn tool than to purchase a new tool. Many tools are used far longer than their maximum life, however, and unless these tools have been repaired periodically, the user pays up to 10 or 20 times the cost of a new tool in lost production.

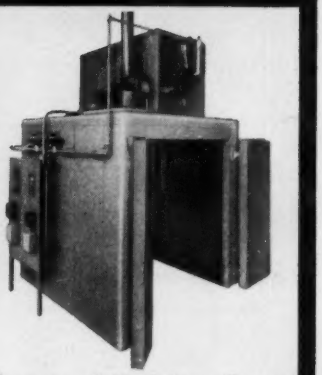
Planned annual retooling therefore is designed to maintain production at peak efficiency by replacing all tools in the foundry when they have reached their maximum life.

Retooling Cost—The cost of such a program for this foundry includes 21 new grinders at an average cost of $300 per unit replaced over an eight-year period. In other words, the yearly replacement cost would be 12.5 per cent of the total, or $787.50. Likewise, seven chippers replaced over four years at a unit cost of about $165 would run $288.75 per year. These replacement costs added together yield a yearly total for the program of $1076.25.

If each of the seven grinder operators earns $2.40 per hr, or $4800 per year, and spends 90 per cent of his working hours running the grinders and chippers, total wages for actual grinding and chipping add up to $30,240 yearly. The aim of planned replacement would be to increase production by 10 per cent, a step which would yield a gross dividend of $3024 per year. After the cost of annual retooling is subtracted, the net yearly dividend comes to $1947.75.

To test whether the investment actually would result in a 10 per cent increase in production or would merely reduce the operator's work load without any accompanying increase in output, Malleable Iron decided to replace all the tools at one station and measure any

LANLY heat processing equipment for the FOUNDRY INDUSTRY



from small Rack type Ovens to the BIG CAR TYPE OVENS

If a need arises to replace or improve your Foundry Ovens, it is only logical to look to LANLY, recognized authorities in the design and construction of heat processing equipment for more than 22 years.

TODAY may be the opportune time to survey your present facilities and request the counsel of a LANLY representative at no obligation.

THE Lanly CO.

FOUNDRY OVENS **2806 Euclid Ave., Cleveland 15, O.**

write for FREE bulletin

Find Your Representative in The Yellow Pages

Atlanta, Georgia Birmingham, Ala.
Boston, Mass. Chicago, Ill. Cleveland, Ohio
Columbus, Ohio Detroit, Mich.
Rochester, N. Y. Pittsburgh, Pa.
San Francisco, Calif St. Louis, Mo.

For More Information Circle 678, Page 39

automated SUPER tumblast® delivers THREE-WAY savings

This Wheelabrator Super Tumblast operates automatically through loading, blasting and unloading cycles. Skip-hoist is designed to accommodate tote boxes for handling unit loads.

A demonstration of WHEELABRATOR'S

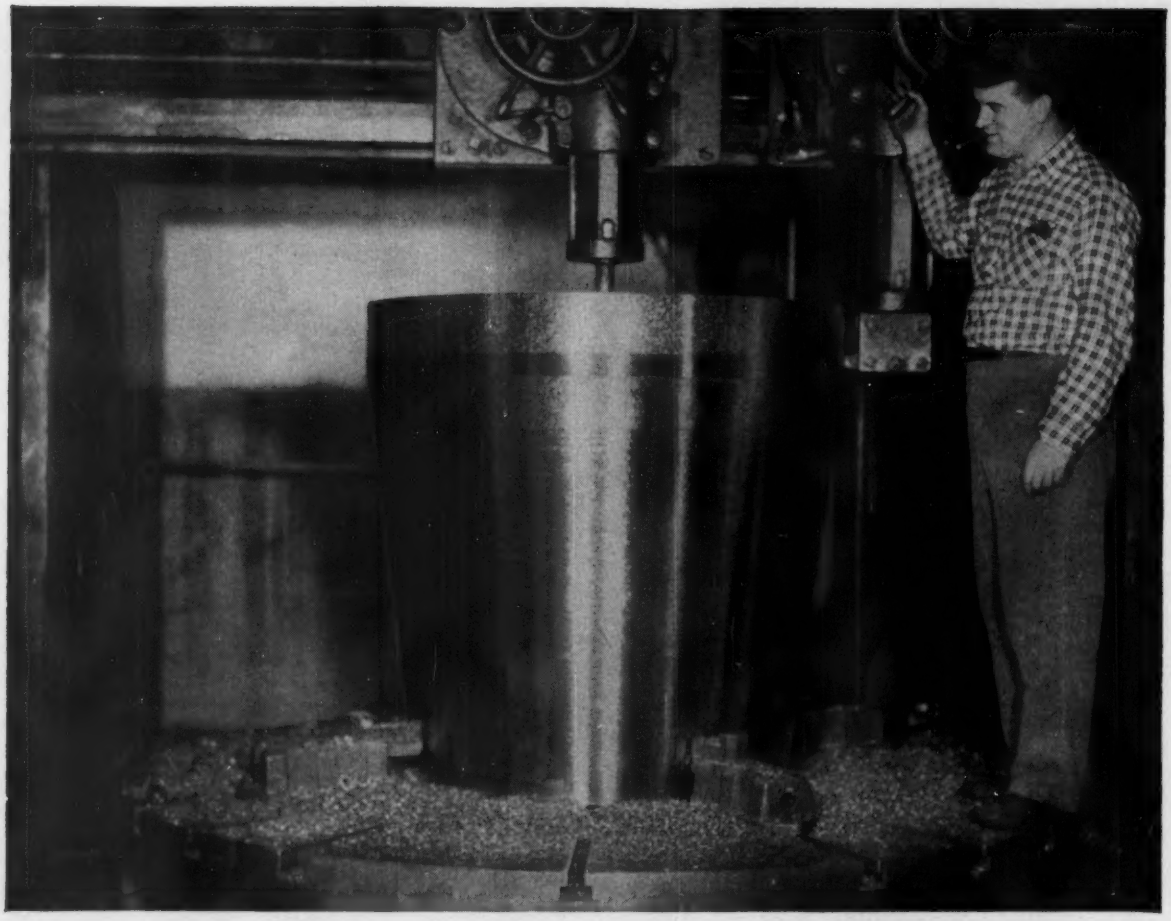
VITAL VALUES

Management at General Foundry & Mfg. Co., Flint, Michigan, can count three important areas of savings, as a result of rearranging their cleaning room around a 22 cu. ft. Wheelabrator Super Tumblast. First, more thorough cleaning permits improved inspection, for increased precision and quality. Second, cleaning cycles have been cut almost in half. Third, the automated operating features of the Wheelabrator blast machine have made it possible to reduce the cleaning room crew from six men to three. Such multiple economies are typical of the vital savings you can expect with Wheelabrator equipment. Get the new Super Tumblast story by writing for Catalog 162-D.

VITAL VALUES FOR INDUSTRY

WHEELABRATOR
AIRLESS BLAST EQUIPMENT

WHEELABRATOR CORPORATION, 505 S. Byrkit St., Mishawaka, Indiana. In Canada, WHEELABRATOR CORPORATION OF CANADA, LTD. 1901 Birchmount Rd. P.O. Box 490, Scarborough, Ontario
A subsidiary of Bell Intercontinental Corp.



Cone made of Ni-Vee* bronze to last 5 times longer in acid river water

The filter cone you see above is being readied for work in corrosive Monongahela River water.

That's why it's made of Ni-Vee bronze.

Expected life is at least five times longer than its predecessor, a grey iron cone now badly eaten away. Installed in a 12" automatic self-cleaning strainer, the Ni-Vee bronze cone will give long-lasting support to filter elements that remove solids from water used for blast furnace cooling.

Another important consideration in making this cone was machinability – all outer surfaces were drilled to receive filtering elements. Ni-Vee bronze easily met this need.

Versatile Ni-Vee bronze

Ni-Vee bronze does a multitude of industrial jobs. Five basic bronze compositions are available – Ni-Vee A, B, C, D, and E. They're modifiable to meet all industrial needs for brass and bronze constructional, pressure or bearing castings.

All the Ni-Vee bronzes deliver excellent "as cast" strength, improvable with heat treatment. (For example, Ni-Vee A bronze yield strength can be increased from 22,000 psi as cast, to 55,000 psi!) In addition, they supply easy castability, low shrinkage, pressure tightness, fine grain size and overall economy.

Each Ni-Vee bronze provides special properties. Type A gives extreme strength. Type D furnishes very high resistance to seizure and galling. All types show little dezincification or stress corrosion under corrosive attack.

Informative booklet on Ni-Vee bronzes

"Engineering Properties and Applications of Ni-Vee Bronzes" covers alloy compositions, strength properties, resistance to high temperatures, corrosion, wear, along with other helpful information. Write us for your copy. *Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N.Y.

NI-VEE BRONZES

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

change in production before coming to a final decision on the program.

No obvious checks, such as time studies, were made on the station. Instead, a record was kept of the performance rating and the makeup per week of the operator with both his old tools and the new set of Ingersoll-Rand tools. Average performance rating for seven weeks with old tools was 98.5 per cent. With new tools, his average performance rating for 10 weeks was 108.3, or an improvement of 9.8 per cent.

In addition, his makeup pay was reduced by approximately 33 per cent. Fig. 2 shows the three-week moving average of the performance rating, which is used to flatten out the variation from week to week. After the new tools had been introduced, all except the lowest three-week moving average were above the best prior productive output.

The almost 10 per cent increase in productive efficiency was achieved in the face of circumstances not present in many foundries. For example, in this instance the air tool operator has to switch back and forth between different tools. Frequently, he may be inclined to use the tool he has in his hand rather than select the best one for the job. In addition, each new casting is a new job which requires a different sequence of tools and cleaning operations. Even the composition of the castings varies over a period of time.

In other areas of the foundry, such as the molding floor, it is easier to carry out a check. For instance, because a molder is equipped with only one sand rammer, it is easier to determine the actual use factor for the tool and to measure production and any improvement through more efficient tooling.

Conclusion—This analysis demonstrated that any foundry would do well to establish a two-part air tool program: 1. Planned annual review of its compressed air system. 2. Planned annual replacement of its air tools. Such programs pay substantial dividends on annual tooling investments whether or not a foundry is an independent or captive operation and whether it produces a large quantity of relatively few parts or castings of many different shapes and sizes.

Dustube® guarantees no visible solids in electric furnace gas

A demonstration of WHEELABRATOR'S

VITAL VALUES

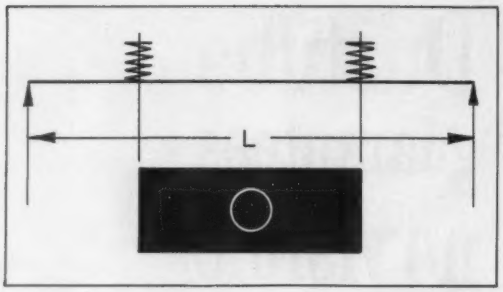
In successfully ventilating 54 electric arc furnaces for 39 steel foundries, Wheelabrator has amassed a wealth of experience that promises an effective solution to your furnace fume problem. As a result, Wheelabrator can guarantee that discharged gases from the dust collector will be free of visible solids. Dustube furnace fume control systems do not restrict furnace operation and maintenance, do not affect metallurgy, minimize hood maintenance, permit easy furnace roof replacement, give maximum furnace roof life. Wheelabrator's vital experience in solving electric furnace problems is at your service. Write for complete information today.

This new 45-ton electric arc furnace, equipped with a Wheelabrator roof type furnace hood system, operates without escape of gas and fume even during melt-down and oxygen lancing cycles at a prominent eastern foundry.

WHEELABRATOR
DUST AND FUME CONTROL

VITAL VALUES FOR INDUSTRY

WHEELABRATOR CORPORATION, 505 S. Byrkit St., Mishawaka, Indiana,
In Canada, WHEELABRATOR CORP. of Canada, Ltd. P.O. Box 490, Scarborough, Ont.



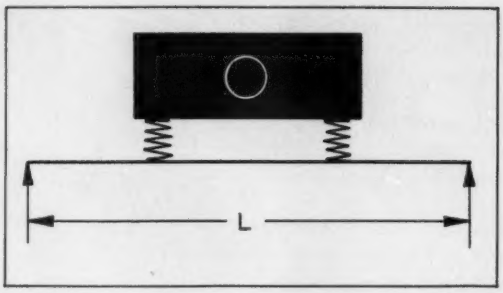


Fig. 1—(left)—Diagram illustrates what to consider as beam length L for a suspended vibrating screen. Fig. 2—A similar diagram is for a floor-mounted installation

Care and Use of

VIBRATING SCREENS

By M. P. HAHN
Senior Engineer
Processing Machinery Dept.
Allis-Chalmers Mfg. Co., Milwaukee

● LONG LIFE and efficient operation of vibrating screens and shakeouts in the foundry depend on several factors, including installation, care, and maintenance.

After a screen of correct capacity and type for a given operation has been selected, its continued benefit to the plant's operation depends largely on the effectiveness of service or maintenance personnel assigned to its operation.

Installation—It is important that a screen be installed so that it is accessible for changing screen surfaces and for lubrication, maintenance, or repair. A platform or walkway facilitates regular inspection.

The vibrating screen's supporting structure should be strong enough to carry its load safely and rigidly enough to avoid a resonant frequency condition at the operating frequency of the screen. Since a resonant or near-resonant frequency causes excessive building vibration, the natural frequency of the supporting structure should be at least 1½ times the operating speed of the screen (Table I).

The following formula is used to check the natural frequency of a structure which supports the screen alone.

For any material,

$$f_n = \frac{44.6}{L^2}\sqrt{\frac{EI}{W}}$$; for steel beams, $f_n = \frac{244{,}000}{L^2}\sqrt{\frac{I}{W}}$ where:

f_n = natural frequency in vibration/minute; E = modulus of elasticity of beam (for steel beams, E = 30,000,000 psi); I = moment of inertia of beam in in.^{4}; W = beam weight per foot in pounds; and L = beam length in feet (see Fig. 1 and 2).

A different method of calculating natural frequency must be used where a concentrated load is supported on the beams and fastened rigidly to them. If flooring is used or there are several equal concentrated loads spaced uniformly along the beam, this weight should be added to the beam and a new weight per foot of beam determined. In questionable circumstances, consult the screen manufacturer for his recommendations and suggestions.

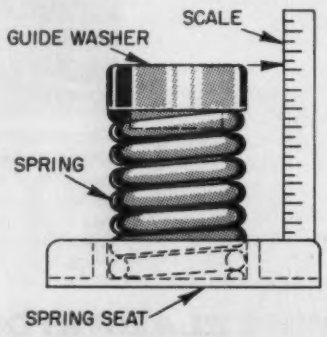


Fig. 3—Spring compressions at both ends of the screen should be equal. A scale should be used as shown here to measure the compressions involved.

It is well to avoid long spans on beams supporting a vibrating screen because the longer the span, the greater the deflection; and the greater the deflection, the lower the natural frequency. Where long spans exist and building vibration is a problem, the addition of one or more intermediate columns to shorten the span will eliminate resonant conditions. This point applies also to foundry shakeouts.

When a floor-mounted or suspended screen is installed, the springs at the feed and discharge ends should be compressed alike (Fig. 3). Supports for the spring bases of floor-mounted screens should be level and in line so that the springs will be evenly loaded when the screen is installed. If air springs are used, those at the feed and discharge ends should be inflated to equal pressure to obtain the recommended working height. The machine also should be checked to be sure it is reasonably level in the transverse direction.

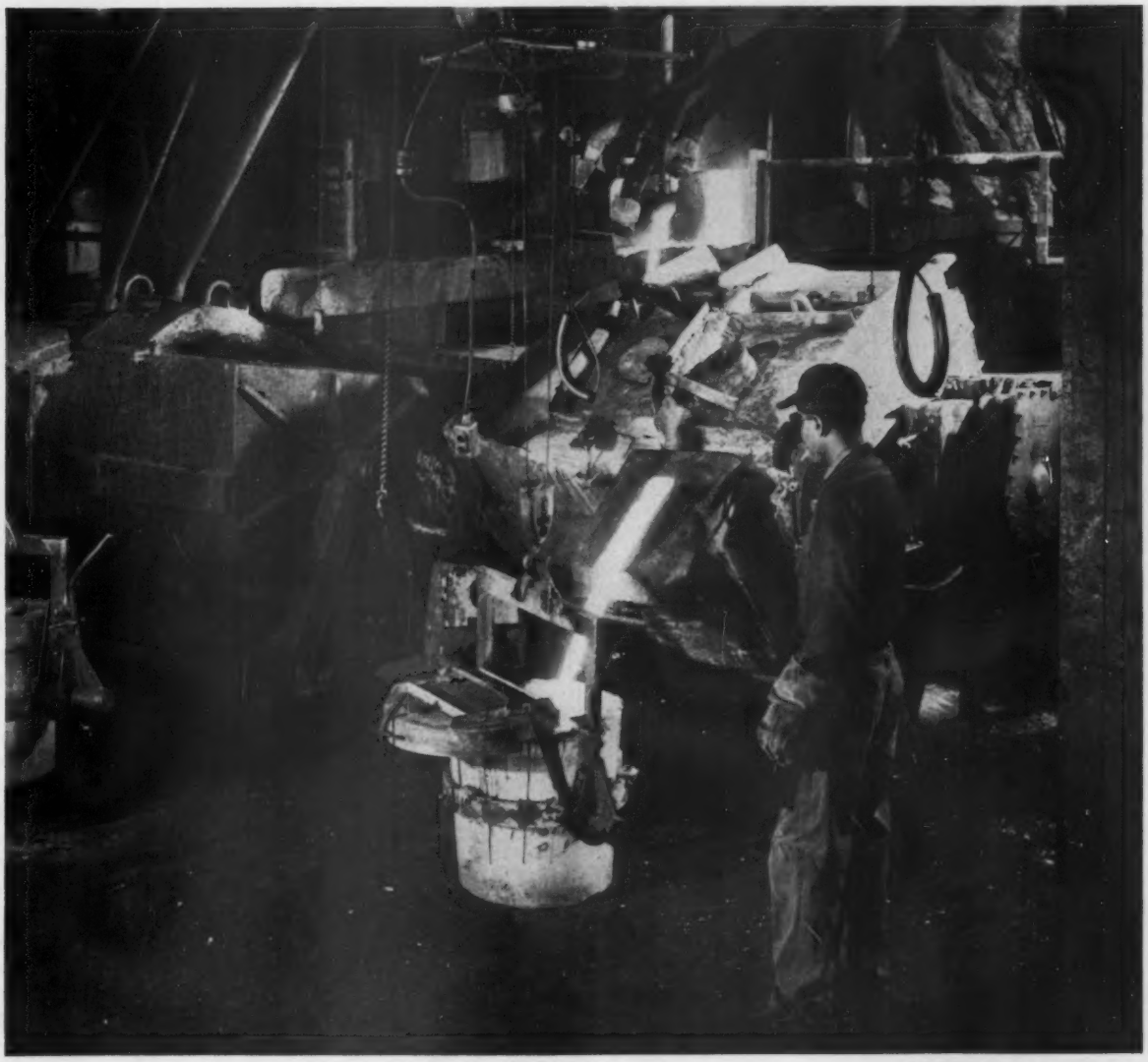
Shakeouts — Free-floating shakeouts are supported at each end on a nest of springs parallel to the cen-

YOU POUR CLEANER IRON EVERY TIME...

if you use *Famous* CORNELL CUPOLA FLUX

for Gray Iron and Malleable Iron Foundries

A little Famous Cornell Cupola Flux, added to each cupola charge of iron, purges molten iron of impurities so that you pour clean metal every time. Furthermore, the iron is hotter, more fluid, and sulphur is greatly reduced. Many dollars are saved in cupola maintenance, too. Digging out is easier as drops are cleaner and bridging over is practically eliminated.



The CLEVELAND FLUX Company

1026-40 MAIN AVENUE, N. W. • CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes . . . Since 1918

FAMOUS CORNELL FLUXES

Trade Mark Registered

For More Information Circle 682, Page 39

TABLE I—Natural Frequency Ratios for Supporting Beams

Length of Beam	Type of Support	Number of Times Frequency of Beam To Be Greater than Frequency of Screen
Not over 16 ft	Directly connected to column	1.5
Over 16 ft	Directly connected to column	2.0
Not over 16 ft	Not directly connected to column	2.0
Over 16 ft	Not directly connected to column	2.5

terline of the operating mechanism. The beams for supporting the shakeout must be spaced properly to correspond to the spacing of the supporting springs on the shakeout. These beams must be parallel and in line. The motor must be mounted on a pivoted base to assure belt tension under all operating conditions.

It is important that the motor be located accurately so that the drive and driven sheaves are properly aligned. The pivoted motor base must be located to give the correct amount of motor overhang with respect to the pivot shaft of the motor base. This varies with the angle of the drive and the weight of the motor, and the recommendation of the shakeout manufacturer should be followed.

Rotation of the shakeout mechanism must be in the direction which makes the belt nearest to the pivot shaft the tight or pulling belt. The support for the pivoted motor base should be arranged so that sand and foreign material cannot build up under the pivoted base and make it inoperative, resulting in inadequate belt tension.

Belt drives on screens should be aligned carefully and tension springs installed to maintain proper belt tension. The springs help to stabilize the screen longitudinally. Care should be taken not to pull the screen out of position during adjustment of the spring.

Only sufficient tension to avoid excessive slippage during starting should be used. The tension spring should be attached to a stationary member of the building and a flexible steel cable used for the connection between the spring and the screen to eliminate whipping.

To stabilize the screen in the transverse direction, friction checks are used. They also snub the motion in the resonant period during starting and stopping.

To obtain a smoother stop, a reversing-type starter can be used. This shortens the stopping cycle and prevents built-up motion during the resonant period.

To reduce bounce of the shakeout during resonance in the stopping cycle, either friction checks or a reversing-type starter are used. The pivoted motor base must be provided with springs to restrict upward motion with such a starter.

To prevent long suspension cables from whipping, a stabilizer block should be clamped to the cable. Location of this block can be determined by trial (see Fig. 4).

Feedspouts should distribute the feed evenly across the width of the screen to utilize the full screen area. Feed velocity to the screen should be held to a minimum to reduce wear and abrasion on the screen surface and to obtain good separation. A good method is to deliver the material in line or parallel to the longitudinal axis of the screen.

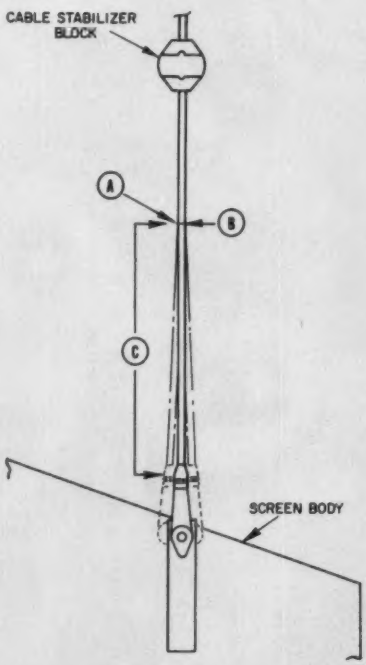


Fig. 4—Drawing of a suspension cable with a stabilizer block. A. Position for stabilizer is found by trial; it will be above this point. B. Point at which vibration is dissipated. C. Distance in which vibration is dissipated varies depending on throw of screen and diam of cable. Stabilizers are needed on cables over 48 in. only when they whip during operation

For material not exceeding 2½ in., a feed chute which feeds the material onto the screen toward the feed end is recommended. This feed chute should incorporate a surge box which will help to control velocity and wear and to distribute feed across the full width of the screen.

Stationary discharge spouts should be removable so that worn sections of screen cloth can be replaced quickly. If head room is available, cable-suspended screens of the multiple-deck type can be raised to expose the discharge end and facilitate changes of worn screen surfaces. This method requires discharge spouts which can be moved out of the way. A minimum operating clearance of 1½ in. must be provided between stationary spouts and the vibrating screen body.

If a sand guard is used around the shakeout, a minimum clearance of 3 in. should be provided between the shakeout and the guard. A floor grating should be used around the shakeout to dispose of any sand spilled from the shakeout deck. The sand conveyor or feeder removing sand from the hopper below the shakeout should be interlocked electrically with the shakeout motor so that the shakeout motor stops when the feeder or conveyor is not operating. This precaution prevents the possibility of the shakeout's operating in a bed of sand accumulated in the hopper which would cause rapid abrasion of the shakeout body.

Operation — Whenever a new screen is started up or new sections of screen cloth have been installed, tension on fine screen cloth should be checked after the first four hours of operation and after eight hours on the heavier screen cloths. Periodic checks for tension should be made thereafter until all the stretch is taken up.

A certain amount of stretch occurs in all sections of screen cloth due to crimps in the wires. Compression springs can be used on the tension bolts to help maintain proper tension as the cloth stretches. Such springs should be compressed solidly when the cloth is tensioned.

Screen cloth should be tensioned

Test it yourself and see. AO "Fyre-Free" meets ASA requirements for flameproofed fabrics. It may smoke, but will not support combustion.

Use it against sparks or light metal splash . . .

AO "Fyre-Free" Clothing Won't Support Combustion

Take any job in the plant with exposure to heavy sparks or light metal splash . . . that's the place for AO "Fyre-Free" protective clothing. Treated with a permanent type of flameproofing, "Fyre-Free" won't smolder — no afterflame or afterglow. It can be washed as many as ten times and still come back for more because the flame-resistant properties stay with it.

This 100% cotton cloth is light in weight . . . with good tensile strength in both warp and fill . . . yet it has the soft feeling of untreated fabric that workers like. "Fyre-Free" clothing is mildew-resistant, does not deteriorate in damp climates or operations.

You can get a full line of "Fyre-Free" coats, pants, coveralls, overalls, sleeves, cape sleeves, aprons and hip leggings. For details and prices, consult your AO Safety Products Representative.

Your Surest Protection . . . AO SURE-GUARD Clothing

American Optical
COMPANY

SAFETY PRODUCTS DIVISION • SOUTHBRIDGE, MASSACHUSETTS

For More Information Circle 683, Page 39

drum tight. Tautness can be checked by tapping the screen cloth with a hammer along the entire length of the screen between longitudinal support bars. If screen cloth is not properly tensioned, it will whip in operation and eventually break. The rubber buffer strips between the screen cloth and longitudinal bars must be renewed when worn so that proper support for the screen cloth is maintained.

All bolts should be checked for tightness after a day's operation and periodically thereafter until bolts are firmly seated. High-strength bolts should be checked to specified torque values.

High-strength bolts are used in clearance holes, and parts bolted together are held in position by friction between the parts. The bolt is not loaded in shear. High-strength bolts, therefore, also can be used in place of turned bolts in reamed holes. This practice eliminates field reaming when new parts are installed. If a torque wrench is not available, install sufficient high-strength fitting-up bolts to bring the parts together; install high-strength bolts in the balance of the holes, and tighten finger tight. Then give nuts an additional ½ to ¾-turn. Follow the same procedure for the fitting-up bolts.

Vibrating Mechanism—Vibrating screens and shakeouts undergo some of the most severe mechanical service of any machinery in a foundry. They are in effect, continuous fatigue testing machines for all of the materials used in their construction. The bearings in the mechanism get the most severe service. They are selected on the basis of their fatigue life, or the number of hours that they are expected to run under proper maintenance before fatigue spalling or flaking appears.

Bearing failures due to improper lubrication, abrasion, wear from contamination, pitting, and corrosion are regarded as preventable and are not considered in estimating the probable bearing life.

To get the expected life from the bearings, it is important that dust seals be kept in good condition, lubrication instructions be followed carefully, and the specified type of lubricant be used.

Lubrication—Extreme care should be exercised when the bearings are greased or the oil is changed. Grease fittings should be wiped off carefully with a clean cloth before the grease gun is applied. The lubricant must be kept in a clean place and handled in clean containers to avoid contamination.

It is important that the lubricant recommended for existing ambient temperature conditions be used. Using too heavy a lubricant in cold weather results in tardy lubrication when the machine is started and causes scoring and galling of the races.

On grease - lubricated mechanisms, a small amount of grease should be added to each bearing during every eight hours of operation. In extremely dusty conditions, grease should be added at more frequent intervals to keep bearing seals effective and prevent dust from entering the bearing chamber. This greasing interval is even more important on shakeouts. On oil-lubricated mechanisms, the

ATTENTION ALL GRAY IRON FOUNDRIES . . .

Now! HOT METAL NEW U. S. "SKLENAR" MELTING FURNACE

LOOK AT THE RECORD

Here's authentic performance data on 500 lb., 1000 lb., and 2000 lb. U. S. "Sklenar" Furnaces equipped with straight gas, oil, or dual fuel burners (no addition of fuel oil necessary when firing with gas), all three furnaces melting gray iron to high temperature for pouring light and difficult castings, with full charges consisting of one half pig iron, with balance in gates, risers and ordinary purchased scrap.

MELTING DATA

500 LB.	1000 LB.	2000 LB.
Time: 30 min.	Time: 40 min.	Time: 45 min.
Oil Used: 11½ gals.	Oil Used: 19 gals.	Oil Used: 40 gals.
*Gas Used: 1400 cu. ft.	*Gas Used: 2800 cu. ft.	*Gas Used: 5250 cu. ft.

*1030 BTU

Really hot metal . . .

of sufficient temperatures to pour light and difficult castings of excellent structure and machinability, with practically no rejects—that's the money-saving story behind the performance record of the revolutionary new U. S. "Sklenar" Reverberatory Melting Furnace. Innovations in combustion, design and construction, with patented features that contribute to faster melting, built-in economy of operation, and lower maintenance costs, are all yours in tomorrow's method of melting metals today!

Available in sizes ranging from 500 to 2000 lbs.—iron, brass and bronze (⅓rd these capacities for aluminum melting).

Get free bulletin. Send today for valuable and informative brochure.

For over 40 years builders of the well-known and favorably regarded U. S. Rotary Melting Furnaces.

U. S. SMELTING FURNACE CO.

3 good reasons why foundry applications depend on quality HOEGANAES products

Reason No. 1

is **HOEGANAES ANCOR FLAME POWDER**

. . . which speeds torch cutting and scarfing of oxidation resistant materials, stainless steels, and even heavy gray iron castings.

Reason No. 2

is the new **HOEGANAES GRADE "A" BRIQUETTES** for melting stock

. . . which are of improved high density and purity. For use in induction and arc furnaces, producing corrosion resistant steel alloys.

Reason No. 3

is **HOEGANAES MELTIRON SHOT** for melting stock

. . . and soon to be introduced on the market. A melting stock low in phosphorous, sulphur and cobalt. HSIC Meltiron has been proven commercially in test quantities to produce high grade stainless and high alloy steels.

Your inquiry on these HSIC products will bring prompt response with literature and product data. Or perhaps you would like the services of a field engineering representative. He's at your service.

HSIC

HOEGANAES

HOEGANAES SPONGE IRON CORPORATION

RIVERTON, NEW JERSEY

SALES REPRESENTATIVES IN PRINCIPAL CITIES: Birmingham, Chicago, Cincinnati, Cleveland (Fostoria), Edmonton (Alberta, Canada), Montreal (Canada), Toronto (Canada), Los Angeles, Mexico 16, D. F. (Mexico), Minneapolis, New England (Elmira, N. Y.), Odessa (Texas), Philadelphia (Riverton, N. J.), Pittsburgh, San Francisco, St. Louis

oil should be changed after approximately 300 hours of operation. Periodic checks should be made to assure that proper oil level is maintained.

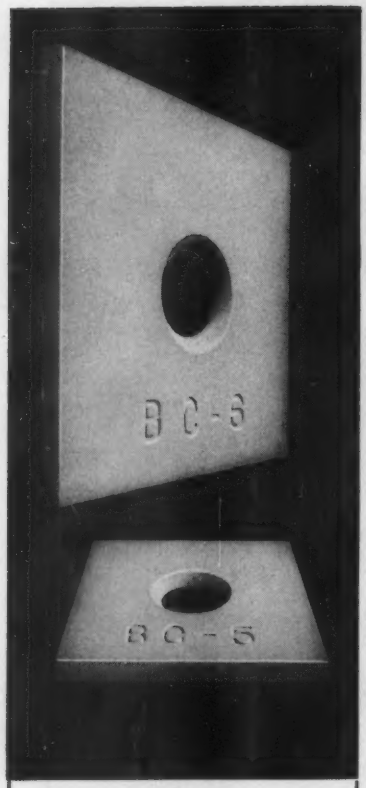
Operating speed of a screen or shakeout should not be increased without consulting the manufacturer. Bearing load increases directly in proportion to the square of speed, and life in hours of the bearing varies inversely as the 3.33-power of loading. In other words, if the bearing load is doubled, the expected bearing life is reduced to one-tenth. Increasing speed also increases stress of all components of the screen body.

Bearing trouble can be detected by a change in the sound of the mechanism. When this change occurs, a convenient shutdown should be scheduled immediately to replace the bearing. Continued operation eventually ruins the seal plate and spacing collar, and these parts may seize and shut down the screen.

Replacing bearings should be done in a clean shop whenever possible. The bearing must be kept absolutely clean after the wrapping has been removed. On most screens, the inner race of the bearing has an interference fit on the shaft, and the bearing should be expanded before assembly by heating in oil to 250° F. Parts for sealing the bearing should be cleaned before reassembling.

Spares—Spare parts such as bearings, seal plates, spacing collars, screen surfaces, tension plates for screen cloth, etc., should be kept on hand at all times. Bearings should be purchased from the mechanism manufacturer because in most instances the bearings used in vibrating mechanisms are selected for closer tolerance on the outside diameter and with greater than standard clearance between the rollers and the races. Also, some mechanisms are arranged for applying the lubricant in the center of the bearing. This construction requires a bearing with a circumferential groove and radial holes in the outer race.

Since vibrating screens and shakeouts are essential to the overall operating efficiency of foundries, it is important that the precision-built mechanisms be properly cared for to assure years of trouble-free service.



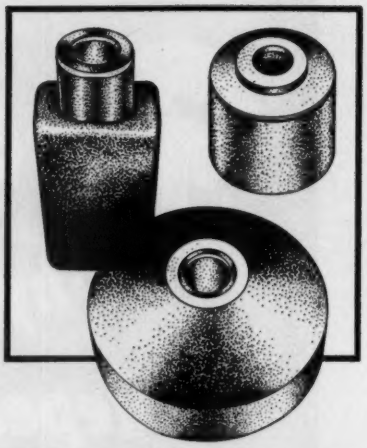
Louthan breaker cores cut foundry costs

You minimize casting problems, get cleaner castings when you use Louthan *refractory* breaker cores. They facilitate rapid removal of the riser, with subsequent labor savings. There is no core gas. Available for all riser diameters from 2″ to 12″, and for use with *any metal casting* risering from a flat surface.

Write for Free Gating and Risering Refractory Folder. Complete file of specifications on all Louthan products.

LOUTHAN
MANUFACTURING COMPANY
A DIVISION OF FERRO CORPORATION
EAST LIVERPOOL, OHIO

For More Information Circle 686, Page 39



CUT YOUR COSTS and SAVE YOUR PATTERNS with ARROW BUTTS and PEINS

Over one half million have been used with complete satisfaction. Send for catalog on complete line of butts and peins. We feature 13 types. Sand rammer butts are our business, not our sideline.

ARROW BUTT COMPANY
4800 W. 139th St., Cleveland 35, Ohio

For More Information Circle 687, Page 39

Get it fast from

BERKSHIRE CHEMICALS Inc.

630 Third Ave., New York 17, N. Y.
Sales Offices: New York • Chicago • Camden
Cleveland • Boston • Pittsburgh • San Francisco

For More Information Circle 688, Page 39

Unbonded Molding Sand and Clay Bonds

By Prof. Willis G. Lawrence, Alfred University, Alfred, N. Y. Formerly with American Brake Shoe Co., where his work dealt with ceramic problems related to metal casting. Prof. Lawrence will discuss the properties of unbonded synthetic molding sands. He also will cover the differences in performance of western and southern bentonites and fire clay.

Mulling and Compacting Molding Sands

By Prof. Richard W. Heine, University of Wisconsin. Before entering teaching in 1947, Prof. Heine was associated with Socony Vacuum Oil Co., Michigan Steel Castings Co., and General Motors Corp. He will discuss mixing and compacting techniques, variations in properties, and the effects of clay and moisture contents on mold compaction.

CO_2 Process and Furan Cores

By Robert J. Mulligan, Archer-Daniels-Midland Co. He previously served as research chemist and as supervisor of foundry research and development prior to his appointment as general sales manager of the Federal Foundry Supply Division. This article will deal with specific problems and their solutions as well as the advantages and disadvantages of each process.

Oil Bonded and Shell Cores

By Edward C. Zuppann, Bendix Corp. Currently foundry manager of the company's Lakeshore Div. In this article Mr. Zuppann will discuss the testing and evaluation of materials, mixing problems, and hidden factors affecting quality. He will explain methods of coating sand for shell cores, types of resins, and relationship of grain fineness to resin content.

Be Your Own Sand Detective

By Joseph Schumacher, Hill & Griffith Co., Cincinnati. Mr. Schumacher is vice president in charge of research, development, and engineering for his company. He will discuss sand testing and the proper evaluation of test data. The article will cover the new clay test, volatile carbon content analysis, dry compression testing, and mold hardness. The significance of each will be evaluated.

SAND SYMPOSIUM ISSUE

These five special articles, written by authorities in the foundry industry, will be featured in the October, 1961 issue of FOUNDRY—in addition to all regular monthly reports and departments. They will bring together in one report a valuable contribution to sand technology. Don't fail to read the Sand Symposium Issue.

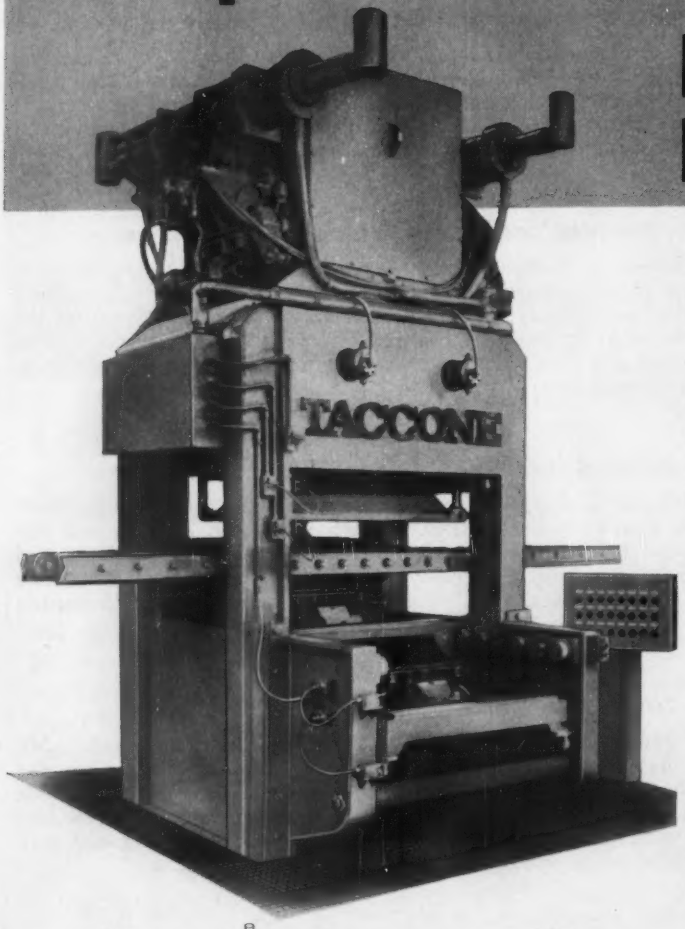
FOUNDRY Penton Building, Cleveland 13, Ohio

TACCONE

Has Met The Challenge!

... By years of research and development with the NEW PATENTED

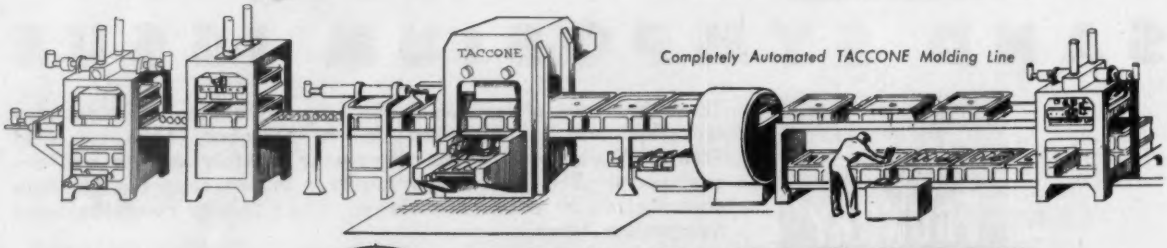
HYDRA-PNEUMATIC MOLDING MACHINE



FEATURES:

- **250 molds per hour**
- **Uniform mold hardness up to 100 (Dietert) set by simple control**
- **Sprue formed during molding cycle**
- **Precision pattern draw**
- **Upset built into machine**
- **In-line flask indexing**
- **All indexing movements cushioned**
- **No jolting or vibrating used**
- **Patterns accessible for quick changes**
- **Unitized TACCONE Power-Pac**
- **Long life compensating pad**

The TACCONE Hydra-Pneumatic Molding Machine makes yours a precision foundry the day it is installed. It can turn out 250 and more green sand molds an hour with no soft spots or soft edges. You get the mold hardness you want—up to 100 (Dietert)—over the entire mold surface. Eliminate mold wall movement; produce precision thin wall castings which TACCONE's engineering knowledge and superior design now make possible. Visit our plant for proof—demonstrated with your pattern and sand. Phone or write today for a demonstration.



Completely Automated TACCONE Molding Line

Demonstrations Invited:
TACCONE Hydra-Pneumatic Mold Machine with Pattern Shuttle Equipment

TACCONE
CORPORATION
NORTH EAST • PA.

For More Information Circle 689, Page 39

MEN of INDUSTRY

RALPH L. LINDNER
. . . v. p.-gen. mgr.

WILLIAM D. JOHNSON
. . . forms diecasting firm

ROGER G. KIMBER

JOHN C. DAY
. . . ASF sales changes

B. H. REGENBURG
. . . pres.-gen. mgr.

Ralph L. Lindner has been appointed vice president-general manager, Precision Castings Co., Cleveland Div. of Precasco Corp., Cleveland. He replaces **A. D. Weigolt**, who retired recently.

Fred R. Geiser, formerly vice president-treasurer, has been elected president, Cincinnati Steel Castings Co., Cincinnati, succeeding the late Leonard Geiser. **Robert S. Ragen** becomes vice president and a director.

James E. Bowen has been appointed general superintendent in charge of a new manufacturing development installation, part of the gray iron foundry, Chevrolet Motor Div., General Motors Corp., Saginaw, Mich., which will be constructed this year. **Ralph W. Pearce**, formerly production superintendent at the gray iron foundry, will succeed Mr. Bowen as superintendent of inspection.

Charles M. Brown has been appointed foundry superintendent, Dodge Mfg. Corp., Mishawaka, Ind., succeeding **Matthew Goodall Jr.**, who has retired. **R. Raymond Reim** succeeds Mr. Brown as assistant superintendent.

John G. D. Welch has been made quality control manager, Precision Castparts Corp., Portland, Oreg. He formerly served in a similar capacity at Gardner-Denver Corp., Grand Haven, Mich. **Ralph H. Zusman** has been put in charge of process development department, **David F. Janney** has been made sales manager of the new Alpha Div., and **Richard L. Lyon** has been named customer service manager.

William D. Johnson has resigned as assistant manager of manufacturing, Bell & Howell, to form his own diecasting firm, Dycast Inc., 8051 N. Ridgeway Ave., Skokie, Ill. At Bell & Howell, Mr. Johnson established and operated the firm's diecasting plant.

John C. Day, assistant vice president in charge of New York and Philadelphia sales offices, American Steel Foundries, Transportation Equipment Div., has been transferred to the Chicago general office. **Roger G. Kimber**, assistant vice president, formerly in Chicago, has assumed charge of the two eastern sales offices, with headquarters in New York.

Walter Loew has been named assistant works manager of the Coshocton, Ohio, plant, James B. Clow & Sons Co., Chicago. He was assistant works manager at the company's Bensenville, Ill., plant.

Robert L. Grau has been named head of the Industrial Sales Dept., Bausch & Lomb Inc., Rochester, N. Y. **David J. Joerger** is in charge of the Laboratory Sales Dept. **James F. Starks** heads the Analytical and Photogrammetric Sales Dept.

B. H. Regenburg has been named president and general manager, Belle City Malleable Iron Co., and Racine Steel Castings Co., Racine, Wis. **C. S. Anderson**, former chief executive officer, becomes chairman of the board, and **R. J. Swartout**, former president, has retired. Other changes within the organization include: **K. M. Halvorson**, vice president-manufacturing; **W. R. Young**, vice president-industiral relations; **H. C. Cunningham**, secretary-controller; **R. D. Leutner**, treasurer-assistant secretary; and **E. K. Simonsen**, sales manager.

George Walther Jr. has been elected president, Dayton Steel Foundry Co., Dayton, Ohio, succeeding his father, the late George Walther Sr. George Walther Jr. will continue as general manager.

Henry M. Brundage has been appointed manager, Chattanooga district, for Allis-Chalmers Industries Group, Allis-Chalmers Mfg. Co., Milwaukee, succeeding **J. Warren Roberts**, Atlanta regional representative. **Thomas L. Dineen** has been made manager of the Cleveland district, succeeding **Joseph Bronaugh**, who becomes manager, utility sales, in Baltimore. **Andrew Wassell** has been made manager, utility sales, and **W. W. Chalmers**, manager, industrial sales, both in Charlotte, N. C.

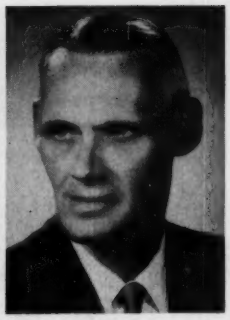
George F. Farley has been appointed executive vice president and

CLAUDE W. ELLIOTT
. . . Lectromelt pres.

FRANK MAROLD

W. R. COLTON
Griffin Pipe appointments

WILLIAM F. JOSEPH
. . . joins Rossborough



FRED E. KASCH
. . . assistant director

general works manager, Spincraft Inc., Milwaukee. He was sales manager for the company's contract division. **Robert J. Saggau** has been named director of sales in charge of contract and product marketing. He joined the company in 1959.

Claude W. Elliott has been named president, Lectromelt Furnace Div., McGraw-Edison Co., Canonsburg, Pa. He succeeds **Fred H. Plank**, who has become president of the company's Pennsylvania Transformer Div., Canonsburg.

Richard W. Arter, formerly technical representative, has been appointed sales manager, airfoil products, Misco Precision Casting Co., Whitehall, Mich., division of Howe Sound Co., Salt Lake City, Utah. **James H. Boyle** has been made sales manager, special products. He formerly was project engineer at the Muskegon, Mich., plant. **Rex Eberly**, former chief estimator, has been appointed sales manager of industrial products. **K. J. Yonker** is vice president in charge of sales for Misco.

Frank Marold has been appointed vice president and assistant general manager, Griffin Pipe Div., Griffin Wheel Co., Chicago, Ill. **W. R. Colton**, formerly St. Paul district sales manager, has been named sales manager.

William F. Joseph has been named technical director, Rossborough Supply Co., Cleveland. For the last 18 years plant metallurgist at Precision Castings Co., Cleveland, Mr. Joseph recently was appointed chairman, Die Casting Process committee, AFS, and has been active in the American Die Casting Institute and Society of Die Casting Engineers.

John C. Crouch has been elected vice president, McKay Co., Pittsburgh, Pa., in addition to his duties as assistant secretary. He joined McKay in 1936.

Fred E. Kasch, for the last two years foundry engineer, Gray Iron Research Institute Inc., Columbus, Ohio, has been named assistant director and will be responsible for introducing improved plant practices. He formerly served as chief metallurgist, Howard Foundry Co.

Max Reading has been named a director, Foundry Services (Canada) Ltd., Guelph, Ont. He will continue to administer the company's technical service and sales operations from his Montreal divisional headquarters. Mr. Reading was chairman of the Eastern Canada Chapter of the American Foundrymen's Society in 1958-59.

Dr. Franz R. Hensel, until recently vice president of engineering, P. R. Mallory & Co., Indianapolis, has joined Clyde Williams & Co., Columbus, Ohio, as executive vice president, and president of the Clyde Williams Corp., an international branch which provides research, technical information, etc. in the United States and Europe.

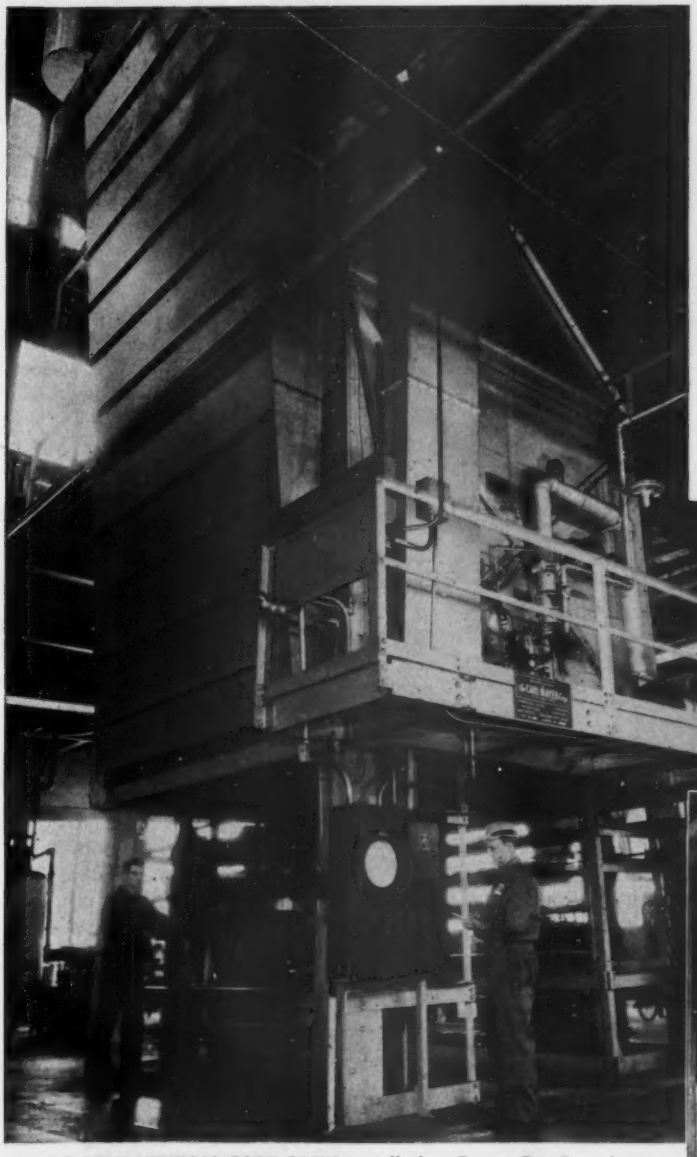
Frank B. Knight has been appointed vice president, and **G. Edward Ammerman**, general sales manager, Chromalox Inc., Murfreesboro, Tenn., subsidiary of Edwin L. Wiegand Co., Pittsburgh.

H. Z. Carter has been elected president, Avondale Shipyards Inc., New Orleans. Formerly executive vice president, he succeeds **J. H. Bull**, who has retired. **Sam P. Stone**, former vice president, has been made executive vice president,

Left to right, James H. Boyle, Rex Eberly, Richard W. Arter and K. J. Yonker
. . . appointments at Misco Precision Casting Co.

Foundry-Proven Money Makers!

Ovens Designed by carl mayer CORP.



The Carl Mayer Corp. experience in engineering and designing industrial ovens and furnaces is second to none! Carl Mayer ovens incorporate recirculating heating systems with sealed combustion chambers and automatic temperature controls for all fuels. Cores and molds are evenly baked faster, with less fuel consumption.

Many foundries of all sizes have found it pays to install Carl Mayer ovens—Our engineers will be glad to work with you on your oven problems. Write or call now!

Write for Bulletin 53-CM

A NEW VERTICAL CORE OVEN installed at Forest City Foundry, Cleveland, Ohio. Size is 12' 7" x 11' 10" x 57' 8" high above floor. 29 carriers, 3 shelves high; each shelf 30 x 106 inches. Features forced cooling and exhaust system for uniform cooling of cores before unloading.

CAR TYPE MOLD OVEN at American Brake Shoe Co. features under floor chain car puller. Size 10' x 10' x 19' long.

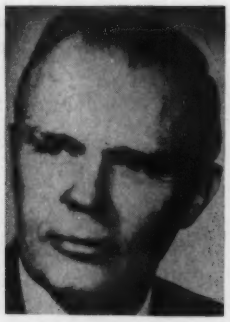
THE carl mayer CORP.

20800 CENTER RIDGE ROAD CLEVELAND 16, OHIO

OTHER PRODUCTS: Heat Treating Ovens and Furnaces • Rod Bakers • Welding Rod Ovens • Paint and Ceramic Drying Ovens • Special Processing Equipment and Accessories

ANTON DORFMUELLER JR.
. . . A-D-M Chemical Group

DONALD E. MOAT
. . . Leeds & Northrup promotions



JOHN F. QUEREAU

HAROLD R. SKEELS
. . . materials dept. mgr.

J. JAMES OFFUTT
. . . executive v. p.

and **Edwin H. Fletcher**, former chief engineer, becomes vice president-engineering.

Anton Dorfmueller Jr. has been appointed manager of the east central and middle Atlantic states for the Chemical Group, Archer-Daniels - Midland Co., Minneapolis, Minn. He continues as manager of the Federal Foundry Supply Div., Cleveland.

F. Kenneth Iverson has been appointed executive vice president, Coast Metals Inc., Little Ferry, N. J., producers of hard facings, brazing alloys and alloy castings. He was manager of sales, Cannon-Muskegon Corp., Muskegon, Mich.

Harley F. Gauker has been named assistant division manager, Trenton Div., Ajax Magnethermic Corp., Youngstown, Ohio. **James R. Coley**, formerly assistant sales manager, becomes sales manager.

Donald E. Moat has been named vice president-government and foreign relations, Leeds & Northrup Co., Philadelphia, Pa. **John F. Quereau** succeeds him as vice president and director of marketing. Mr. Quereau was vice president and director of manufacturing.

Harold R. Skeels was appointed manager, materials department, Bartlett-Snow Div., Bartlett-Snow-Pacific Inc., Cleveland. He formerly was production control manager of Bartlett-Snow.

Francis M. Miller has been appointed superintendent, electric department, Dravo Corp.'s Neville Island, Pa., plant. Mr. Miller joined Dravo in 1957.

L. A. Kristoff has joined Alloys & Chemicals Corp., Cleveland, as executive assistant and will head the newly formed Special Products Div. Mr. Kristoff was president of Midwest Aluminum Supply Corp. until the company's merger with Luria Brothers, Cynwyd, Pa.

Lyn Roberts has been appointed sales manager, Combined Supply & Equipment Co. Inc., Buffalo, N. Y., and **Don Paterson** has been made sales representative. **Everett LeVinees**, vice president and sales manager, has retired.

J. James Offutt, vice president and general manager, has been elected executive vice president, A. P. Green Fire Brick Co., Mexico, Mo. He succeeds L. J. Miller, who has retired.

Richard E. Oswald has been elected vice president, Oswald Refractories Co. Inc., St. Louis. He is also vice president and sales manager of an affiliate, Alsey Refractories Co., Alsey, Ill.

Ralph Huft has been named assistant general manager, Foundry Div., Hills-McCanna Co., Chicago, Ill. He formerly was sales promotion manager in Carpentersville, Ill.

Schaeffer E. Specht has been appointed general sales manager, Buell Engineering Co., New York, and will supervise all sales operations for Buell Engineering and its Northern Blower Div., Cleveland. He formerly was western district sales manager.

John W. Goth has been named manager of foundry sales, Climax Molybdenum Co., Div. of American

F. KENNETH IVERSON
. . . executive v.p.

HARLEY F. GAUKER

JAMES R. COLEY
. . . changes at Ajax Magnethermic

LYN ROBERTS
. . . sales manager

JOHN W. GOTH
. . . mgr., foundry sales

Eaton turns out 4,000 like this every day with BAKELITE® FOUNDRY RESINS

At Eaton Manufacturing Company, Foundry Division, Vassar, Michigan, BAKELITE foundry resins are helping to produce more and better castings.

Gray iron pump bodies and covers are mass-produced from shell molds made with BAKELITE phenolic resin BRW-7151. Daily production has been greatly improved due to the faster mixing cycles possible with BRW-7151. Good resin flow properties ensure ideal shell weight pick-up and optimum green strength on pattern plates. Eaton has been able to produce more castings per ton of metal poured since rejects caused by poor shells have been greatly reduced. The excellent storage properties of BRW-7151 hot-coated sand allows Eaton to keep a constant supply of material for their conveyor casting operation.

If you're looking to improve shell molding performance why not check our BAKELITE foundry resins. Our foundry trained representative will be happy to discuss with you all the BAKELITE Brand Foundry Resins for shell and core molding. Call him now. Or write Dept. HC-52P, Union Carbide Plastics Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. *In Canada:* Union Carbide Canada Ltd., Toronto 12.

UNION CARBIDE PLASTICS

BAKELITE and UNION CARBIDE are registered trade marks of Union Carbide Corporation.

CLYDE D. WOODBURN
. . . district manager

GEORGE R. EUSNER
. . . executive v.p.

JOHN V. HAIDER

MELVIN R. PRICE
. . . appointments at Pangborn

JOHN B. VAN DIEN JR.
. . . division gen. mgr.

Metal Climax Inc., New York. He joined the company in 1954 and until recently was head of the Chicago sales office, where he will continue to work.

Clyde D. Woodburn has been named manager, Philadelphia district office, Industrial Div., Corn Products Sales Co., New York, succeeding **Henry Heinstadt,** who has retired. Mr. Woodburn formerly was sales-service manager for the company's eastern region.

Dr. D. M. Gillies has been appointed director of research, Union Carbide Metals Co., a division of Union Carbide Corp., New York. He will have office in Niagara Falls, N. Y., and succeeds **Dr. F. J. Shortsleeve,** who has been appointed product manager for the company.

Michael Keimel has joined Milwaukee Chaplet & Supply Corp., Milwaukee, Wis., as sales representative for the Equipment Div.

Robert L. Wicker, formerly with Bros. Inc., Minneapolis, has joined American Hoist & Derrick Co., St. Paul, as manager of distributor sales.

George R. Eusner, formerly chief of the Refractory & Mineral Technology Div., U. S. Steel Corp., Monroeville, Pa., has been elected executive vice president, Davis Fire Brick Co., and its associates Cambria Clay Products Co., Ohio Fire Brick Co., and Sivad Ceramic Corp., Oak Hill, Ohio.

Harry M. Francis, executive vice president, American Steel & Wire Div., U. S. Steel Corp., Cleveland, Ohio, has retired after 46 years of service.

Melvin D. Gerald recently joined Menthall Machine Co., Suffolk, Va., as manager of the foundry divison.

Norman A. Matthews has been appointed group leader, Ferrous Metallurgy, Research Laboratory, International Nickel Co. Inc., Bayonne, N. J. He formerly was associated with the Metallurgical Products Dept., General Electric Co., Detroit.

Leland P. McNabney has been named Chicago district purchasing agent, Vulcan Mold & Iron Co., Latrobe, Pa. He succeeds the late Donald Hanna. Mr. McNabney was with Combustion Engineering Co., East Chicago, Ind. His new headquarters will be at Vulcan's Lansing, Ill., plant.

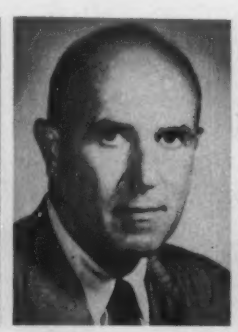
John V. Haider, formerly sales engineer, has been appointed manager of the Pittsburgh sales district, Pangborn Corp., Hagerstown, Md., succeeding **John D. Wise,** who has retired. **Melvin R. Price** has joined Pangborn as sales engineer, Pittsburgh district.

John B. Van Dien Jr. has been named general manager, Non-Destructive Testing Div., General Magnaplate Corp., Belleville, N. J. He joined General Magnaplate as director of the division in 1959.

Jack Kaye has been elected vice president, Luria International Div., Luria Bros. & Co., New York. He was formerly with Beer, Sondheimer & Co., Frankfurt, Germany. Luria Bros. is a division of Ogden Corp., New York.

Charles D. Schmidt has been named manager of the Detroit district sales office, Whiting Corp.,

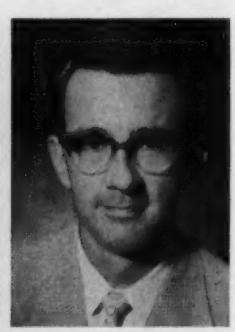
MICHAEL KEIMEL
. . . equipment sales



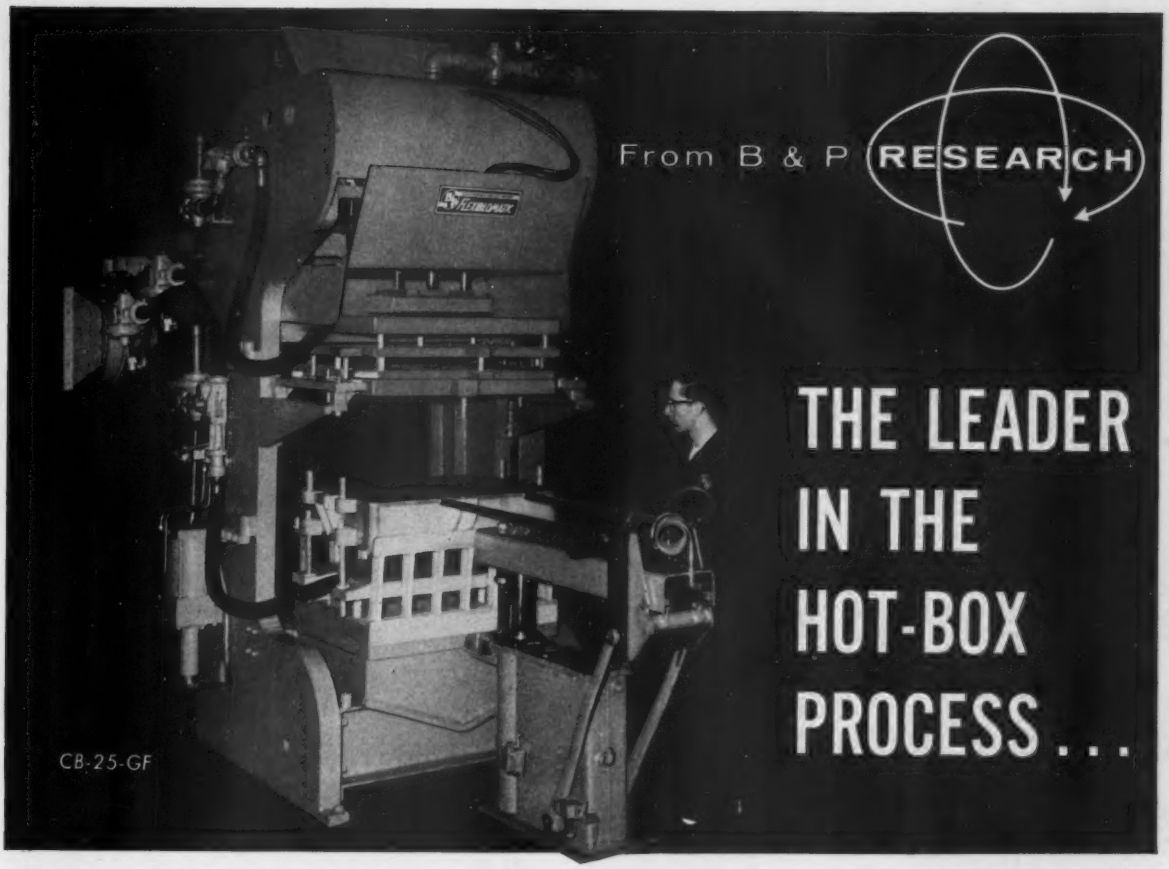
ROBERT L. WICKER
. . . joins American Hoist

NORMAN A. MATTHEWS
. . . INCO ferrous research

LELAND P. McNABNEY
. . . purchasing, Vulcan



CHARLES D. SCHMIDT
. . . district mgr., Whiting



FLEXIBLOMATIC®

Big Cores or Small Cores, Here's a *Complete Line of Automatic Machines to Meet the Toughest Production Requirements

Only Beardsley & Piper with its vast research and development facilities could bring simplification of design plus top operating efficiency to the newest coremaking process in the industry—The Hot-Box Process. Ideal for all furfuryl-type binders, B&P's Flexiblomatic for the Hot-Box Process produces up to 140 cores per hour using a 15 second cure time. Production will, of course, be increased with reduced cure time . . . and a proportionate increase in cores is achieved through the use of multiple cavity core boxes.

Simplified, single station design means that the entire coremaking process is done in one machine—only one core box is required—there is no core box transfer—there is no double handling—and no rollover mechanism is necessary on the Flexiblomatic. These cost cutting features mean less initial cost, less gas consumption, and less square feet of floor space required. The fewer moving parts on the Flexiblomatic means less maintenance, too.

AUTOMATIC BLOW, CURE AND STRIP

In addition, the Flexiblomatic assures the best possible core through thermostatic temperature control of both halves of the core box. Automatic sequence control of blow, cure and strip eliminates error, assures uniform cores and minimum time cycles. Production is exceptional with single machine operation but even greater production efficiency can be attained with Flexiblomatic because one man can operate two machines.

Why not call in your B&P representative and get the complete story on the cost-cutting Hot-Box Process. This new process produces cores of outstanding dimensional stability and collapsibility and offers untold savings in time and materials . . . the Flexiblomatic affords optimum savings with the most efficient method of producing Hot-Box cores.

BEARDSLEY & PIPER
Div. Pettibone Mulliken Corp.
2424 N. Cicero Ave., Chicago 39, Ill.

For More Information Circle 692, Page 39

JOHN KLONOWSKI
. . . sales-application eng.

R. A. WANTY
. . . joins Chromalloy

HAROLD BURTON
. . . joins Rotor Tool

GEORGE F. TASEFF
. . . Imperial Belting sales

O. R. MAGOTEAUX
. . . products research

Harvey, Ill. He previously was on the sales staff of the Chicago Office.

John Klonowski has been appointed sales and application engineer, U. S. Graphite Co., Saginaw, Mich. He joined the company in 1955 and now will maintain headquarters at 32 Kayview Ave., Bethel, Conn.

R. A. Wanty, formerly with American Foundries Co., Milan, Mich., has joined Chromalloy Corp., Elyria, Ohio, as sales engineer in the Michigan territory.

Frederick C. Kroft has been named staff assistant to the president, Haynes Stellite Co., Div. of Union Carbide Corp., New York. He joined the company in 1936. **Glen H. Shelton,** assistant works manager, has succeeded Mr. Kroft as works manager. Mr. Shelton has been with Haynes Stellite since 1948.

John J. Wallace has been elected president-general manager, PRAB Conveyors Inc., Detroit. He was with Hapman Conveyors, Kalamazoo, Mich.

Ervin S. Fabiszak, Motor Castings Co., Milwaukee, has been named president of the Industrial Management Club of West Allis. **Elmer Reinschmidt,** Lawran Foundry Co., Milwaukee, was made secretary-treasurer.

Arthur Case has been appointed development chemist for the Adhesives & Chemicals Div., Borden Chemical Co., New York, at the division's development laboratories, Bainbridge, N. Y.

Harold Burton has been named sales engineer in the northwestern Ohio area for Rotor Tool Co., Cleveland, a subsidiary of Cooper-Bessemer Corp., Mt. Vernon, Ohio.

David M. Gibson, formerly with United Shoe Machinery Corp., Boston, has been named manager of marketing services, Hitchiner Mfg. Co., Milford, N. H.

Warren A. Logelin, formerly with Fairbanks, Morse & Co., Chicago, has been appointed director of public relations and advertising, American Steel Foundries.

John E. Taylor has named grinding wheel sales representative in the Canton, Ohio, area for Norton Co., Worcester, Mass., succeeding **George W. Nelson,** who has retired after 46 years with the company.

Edward R. Talone and **Charles F. Dilcher** have been appointed sales representatives, Michigan Oven Co., Detroit. Mr. Talone will represent the company in Baltimore, Mr. Dilcher, in Atlanta.

JAMES H. LANSING
. . . received ASTM Award of Merit for long and continued service to Committee A-7 on Malleable Iron, as reported in the August issue

George F. Taseff has been made sales engineer for the mid-western area, Imperial Belting Co., Chicago, replacing the late **Fred Adams.** He will serve in southeastern Iowa, central Illinois, and northeastern Indiana.

O. R. Magoteaux, formerly with National Lead Co. of Ohio, Fernald, Ohio, has been transferred to its subsidiary, Chas. Taylor Sons Co., Cincinnati, Ohio, as a member of the research staff.

Louis R. Larsen, formerly with Carborundum Co., Niagara Falls, N. Y., has joined Beryllium Corp., Reading, Pa., as sales engineer.

F. S. Wittenauer, chief accountant, Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, Ohio, has been named assistant general sales manager of the division.

Robert A. Herstine has joined the sales staff of Taylor-Wharton Co., division of Harsco Corp., High Bridge, N. J. Previously he was with Bethlehem Steel Co., Bethlehem, Pa.

William F. Peschel has been named manager of the Induction Heating Equipment Div., Olsen Mfg. Co., Royal Oak, Mich. He was with Ajax Magnethermic Corp., Youngstown, Ohio. **William M. Peterson,** formerly with Cargill-Detroit Corp., has been made chief engineer for Olsen.

Ernest H. Faust Jr. has joined the research staff of Electro Refractories & Abrasives Corp., Buffalo. He was with American Refractories & Crucible Corp., North Haven, Conn.

BQ AUTOMATIC MOULDING MACHINES in Europe's largest malleable iron foundry

Photograph by kind permission of Ley's Malleable Castings Co. Ltd. Derby England.

Agents in U.S.A.:
Stamford Engineering Works : 507 Canal Street, Stamford, Connecticut.
Maine, Vermont, New Hampshire, New York, Massachusetts, Connecticut, Pennsylvania, New Jersey, Delaware, Maryland, West Virginia, Virginia, North & South Carolina, Georgia, Florida.

American Silica Sand Inc., 402 Central Life Building, Ottawa, Illinois.
Minnesota, Wisconsin, Michigan, Iowa, Missouri, Illinois, Indiana, Ohio, Kentucky, Tennessee, Alabama, California.

M. A. Bell Co., 217 Lombard Street, St. Louis 2, Missouri.
Nebraska, Colorado, Kansas, Oklahoma, Arkansas, Texas, Louisiana.

Carl F. Miller & Co., 2450 6th Ave., South Seattle 4, Washington.
Washington, Oregon.

Agents in Canada:
Drew Brown Ltd., 5410 Ferrier Street, Montreal 9. All States.

For details of straight draw or turnover machines write ***NOW:***

BRITISH MOULDING MACHINE CO LTD

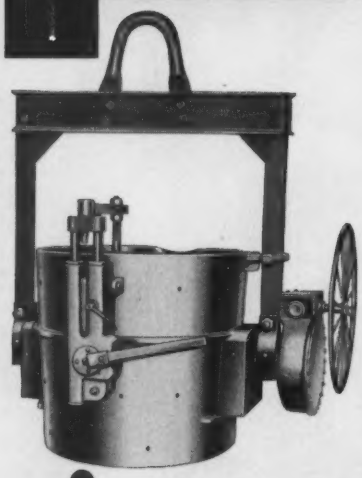
WESTON WORKS FAVERSHAM KENT ENGLAND

P5296

For More Information Circle 693, Page 39

safe

slag-free pouring in large volumes



Industrial

TYPE 568 TGT

A BOTTOM-DISCHARGE LADLE in models with capacities from 10,000 to 40,000 lbs. Geared discharge mechanism. Eighteen lever positions are provided for adjusting the operating lever to proper height for safe, easy pouring. Lift column locks at any height. Gear unit operates in continuous oil bath; housing cover bolted at rear for easy maintenance. Engineered overall to save space, promote safety and efficiency.

Send your pouring problems to us. Ask for the latest catalog on our complete line of standard and custom pouring and handling equipment.

Industrial

EQUIPMENT COMPANY

115 OHIO ST., MINSTER, OHIO

For More Information Circle 694, Page 39

OBITUARY

Frank J. Kerbs, 76, retired president, Capital Brass & Aluminum Foundry Co., Chicago, died Aug. 4. He retired in 1957 after 35 years with the company.

J. G. Winget, foundry superintendent, Reda Pump Co., Bartlesville, Okla., died Aug. 4.

William W. Champion, 61, retired foundry supervisor, Bonney-Floyd Co., Columbus, Ohio, died July 29.

Frank V. Gauer, 71, assistant superintendent of pattern shop and foundry, Falk Corp., Milwaukee, died July 24. He had been associated with the company for 47 years.

H. Glenn Edsall, 76, retired foundry superintendent, Atlas Steel Foundry Corp., Buffalo, died July 24.

Harold R. Saurer, 61, former chief metallurgist, Dayton Malleable Iron Co., Dayton, Ohio, died July 9. He joined the company in 1924.

Herbert V. Hites, 66, retired quality product engineer, Ohio Steel Foundry Co., Springfield, Ohio, died July 1. Until his retirement, Mr. Hites had been employed by Ohio Steel for 50 years.

John L. Treybal, 52, sales engineer, Bendix Foundry Corp., Teterboro, N. J., died July 15.

New American Standard Issued For Diamond Grinding Wheels

The Grinding Wheel Institute, Cleveland, has made available "American Standard Specifications for Shapes and Sizes of Diamond Grinding Wheels, Hand Hones, and Mounted Wheels, B74.3-1961." It contains 37 pages of information on standard shapes and sizes of diamond grinding wheels.

Copies may be obtained free from the Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, Ohio.

product defects

getting you down?

let us help you...

- find hidden cracks with magnetic particle or dye penetrant inspection equipment
- find deep-lying defects with x-ray or gamma radiography equipment
- see "innards" directly with bright-image fluoroscopes
- work out the method at our Industrial Applications Lab

call any local Picker office where a technical expert is always near (see 'phone book) or write

Picker x-ray

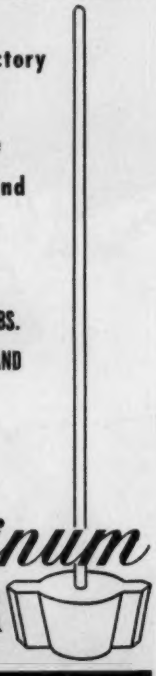
25 So. Broadway, White Plains, N.Y.

For More Information Circle 695, Page 39

The only thoroughly satisfactory way to deoxidize molten steel in the ladle or furnace, and improve its grain structure.

WEIGHTS FROM 1 TO 60 LBS. WE ALSO MAKE SHOT AND NOTCH BAR

CEMCO Aluminum EY-BAR TRADE MARK



Mfg. exclusively by:

CLEVELAND ELECTRO METALS COMPANY...

2391 W. 38th St. Cleveland 13, Ohio

Phone: MElrose 1-5435 and 1-5436

For More Information Circle 696, Page 39

if a

BIG saving

...IN STEEL ABRASIVE COSTS IS IMPORTANT TO YOU...

you certainly should investigate **"SUPER-STEEL"**
SHOT OR GRIT

★ It costs only **$165.00** per ton, truck loads — considerably less than competitive steel abrasives!

★ It's unequivocally *guaranteed* to equal the performance of all higher priced steel abrasives!

★ It equals, or exceeds, "resistance-to-breakdown" ratings of higher priced steel abrasives!
(Checked on SAE-approved, Mattson-Cargill shot life testers.)

★ It's doing an excellent job of cleaning in foundries and descaling in steel and metalworking plants.
(Should you desire first-hand information from actual users of "SUPER-STEEL", write us for names of firms in your area.)

We'll gladly rush a trial order, additional information or have our sales engineer call.

METAL BLAST, INC.

872 EAST 67th STREET • CLEVELAND 3, OHIO • Phone: EXpress 1-4274

ALSO IN: Chattanooga • Chicago • Cincinnati • Dayton • Detroit • Elberton, Ga. • Grand Rapids • Greensboro, N. C.
Houston • Los Angeles • Louisville • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh and St. Louis.

MANUFACTURERS, ALSO, OF TOP QUALITY "SEMI-STEEL" SHOT AND GRIT, MALLEABLE AND CHILLED SHOT AND GRIT — AT COMPARABLE SAVINGS!

SCIENTIFIC
PRESSURE CAST
MATCHPLATES

CHECKED FOR QUALITY
7 WAYS

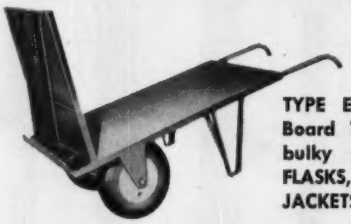
Inspected at 7 points of manufacture for highest possible matchplate quality . . . Scientific is the only producer using patented new Fortschneider Shift Indicator.

THE SCIENTIFIC CAST PRODUCTS CORP.
1390 East 40th Street • Cleveland 3, Ohio

For More Information Circle 698, Page 39

NEW!

FLASK & BOTTOM BOARD TRUCK



TYPE E-4 Flask & Bottom Board Truck for conveying bulky materials, such as FLASKS, BOTTOM BOARDS, JACKETS, PATTERNS, ETC.

For such work this truck has no equal, because the operator of this unit can convey twice the load with less effort, and will experience perfect balance of load at all times. Truck has a load capacity of 700 lbs., and comes in two sizes: loading surfaces 36″ x 48″, vertical nose 30″ high; loading surface 30″ x 48″, vertical nose 36″ high. Wheels: two—16″, ball bearing, pneumatic tubeless tires. Construction: 12 gage sheet steel, properly reinforced. Can be made to customer specifications if desired.

AWS

FOUNDRY SUPPLIES & EQUIPMENT
4727 S. Hoyne Ave., Chicago 9, Ill.
Phone: Virginia 7-0120

For More Information Circle 699, Page 39

FAST, ACCURATE, DEEP READINGS

Marshall Thermocouples Promote Castings Quality!

Marshall Enclosed-Tip Thermocouples assure strong, dense, uniform castings from every nonferrous melt! Tip can be immersed 3 inches to 30 inches or more in depth and stirred to speed pyrometer reading. You get accurate temperature from deep within melt in about 20 seconds! Hot junction tip, armored with enclosing tube of special alloy, withstands scores of immersions before low-cost replacement is necessary. Thermocouple wire can't be contaminated from melt or shortcircuited by slag! Rugged, well-balanced Marshall Thermocouples are convenient to carry and use, simple and economical to operate. Available as Furnace Type (below) in lengths up to 10 feet, for use with Stationary Pyrometer . . . or Ladle Type for use with Portable Pyrometer.

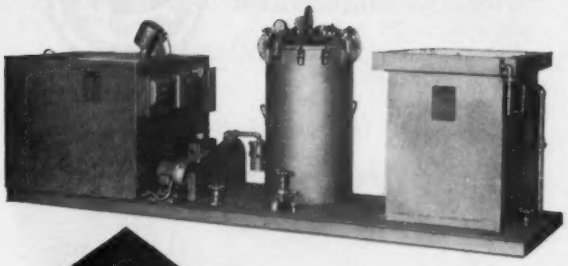
. . . write today for Free Catalog!

L. H. MARSHALL CO. 270 WEST LANE AVE. COLUMBUS 2, OHIO

For More Information Circle 700, Page 39

CUT REJECTS

OUT OF YOUR COST PICTURE!



MOGUL PACKAGED-UNIT

HIGH VACUUM and PRESSURE IMPREGNATORS

IMPROVE PRODUCT QUALITY

MOGUL means dependable, thorough impregnating with Mogul cast seal or any other impregnating material including polyesters and phenolic resins.

MOGUL, because of extremely high vacuum, removes air and moisture for positive penetration of impregnant into parts. Following this vacuum action, applied pressure then assures still greater coverage and impregnation.

CHECK THESE MOGUL ADVANTAGES:

- **COMBINATION high vaccum and pressure**
- **VERSATILE sizes and ranges: 2 to 100 cu. ft. as standard models 29" or more vacuum, 100 lbs. pressure**
- **THERMOSTATIC CONTROLS**

PLUS:

READY-ASSEMBLED INSTALLATIONS that save work, time and cost

Just hook up complete packaged unit to your utilities and start operation!

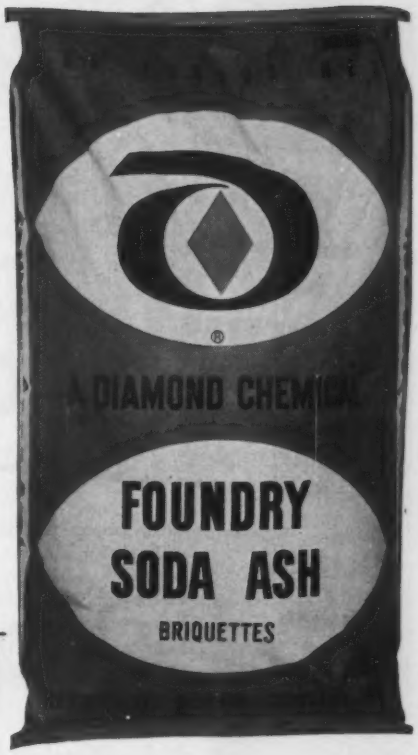
ASK ABOUT MOGUL CUSTOM DESIGNING & BUILDING

Phone SAcramento 2-3710 — or write

METALLIZING COMPANY OF AMERICA, INC.
3520 W. Carroll Avenue, Chicago 24, Illinois

For More Information Circle 701, Page 39

NEW



DIAMOND FOUNDRY SODA ASH BRIQUETTES

for fast, efficient, desulphurizing action

No inactive ingredients to add to cost. Pillow shaped for easy handling and fast, efficient desulphurization of molten metal in cupola or ladle. Diamond Foundry Soda Ash Briquettes permit greater use of scrap metal in melting, release entrapped gases and increase fluidity. Tough, moisture-proof 100-lb. bags keep them dry, effective and safer to use.

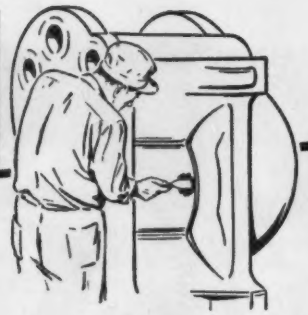
For prompt shipment and technical assistance, call your nearest Diamond sales office.
Diamond Alkali Company, Cleveland 14, Ohio

4701 Paddock Cincinnati, Ohio REdwood 1-3200	12 South 12th St. Philadelphia 7, Pa. WAlnut 5-8017	4246 Forest Park Blvd. St. Louis 8, Mo. JEfferson 5-2232
20 N. Wacker Dr. Chicago 6, Ill. STate 2-9550	Oliver Building Pittsburgh 22, Pa. GRant 1-7500	Box 2088 DeSoto Station Memphis, Tenn. BRoadway 2-1736
421 Hanna Bldg. Cleveland 15, Ohio SUperior 1-8683	1006 Main St. Houston 2, Texas FAirfax 3-7329	99 Park Avenue New York 16, N. Y. OXford 7-0440

Other Diamond Chemicals for the foundry: MOROC, silicate CO_2 binder, Caustic Soda, Chlorine, Solvents

Diamond Chemicals

For More Information Circle 702, Page 39



These features mean

BETTER LOOKING CASTINGS

TIGHT, LASTING REPAIRS

When correcting blow or sand holes, surface blemishes, or rough and porous areas in castings, you can depend on Smooth-On Foundry Cements, standard of the industry for more than 63 years. They are easy to apply, harden quickly, stay firmly in place.

THREE DIFFERENT SHADES

With 3 different shades to pick from, you know you can get a close match for your castings.

4AA—Light gray, fine texture
4A —Medium gray, medium texture
4B —Dark gray, coarser texture

UNIFORM QUALITY

Rigid quality control means you can be sure that the strength and color of Smooth-On Foundry Cements will not vary from one order to the next. Every lot of Smooth-On cements is laboratory tested and must satisfy tests for setting time, hardness, and color before it is packed for shipment.

FREE SAMPLES

Why not try one or more of these Foundry Cements at our expense? We will be glad to send you a free sample of any of the cements described above if you will write us on your business letterhead. Write today, and see how Smooth-On can improve the appearance of your castings.

SMOOTH-ON MANUFACTURING CO.
570 Communipaw Ave., Jersey City 4, N. J.

SMOOTH-ON
FOUNDRY CEMENTS

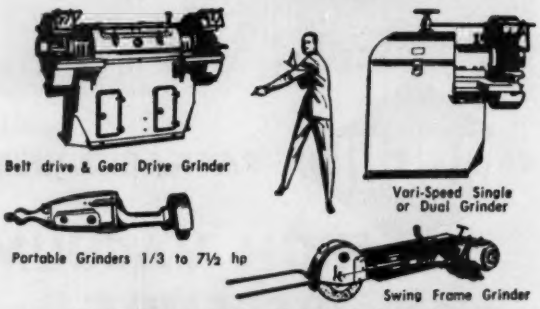
60-389

For More Information Circle 703, Page 39

GRINDERS

Now when quality performance and money-saving are of utmost importance—when cost-minded executives demand exacting vigilance, these tools fulfill every requirement.

"Over 60 Years Service to Industry"

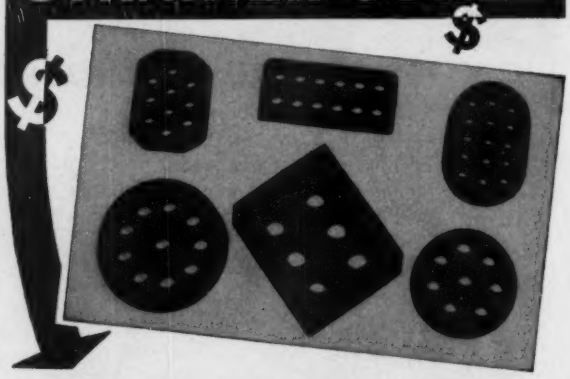


Write for catalogs and new bulletins

The United States Electrical Tool Co.
3640 LLEWELLYN ST., CINCINNATI 23, OHIO

For More Information Circle 704, Page 39

Save Money *with* RUDOW STRAINER CORES



Custom Made • Will Duplicate Your Sample or Drawing • Unlimited Design Range • High Heat Resistance • Extra Hard • Saves Time—Trouble

RUDOW quality Strainer Cores cut rejects, cut costs, keep castings free of oxides, slag and impurities—simplify gating control and metal flow, for greater production. We offer you Free Samples of RUDOW Strainer Cores—made like your sample, or from your drawing. Write today—or phone MAin 6-1163.

SEND FOR FREE BULLETINS, PRICES ETC.

RUDOW MANUFACTURING CO.
2602 Venice Rd. • P. O. Box 2121 • SANDUSKY, OHIO

For More Information Circle 705, Page 39

PENN BUCKETS

Careful balancing makes Penn Buckets self dumping when loaded and self righting when empty. Welded construction prevents "clinging" makes them empty easily and completely.

WRITE TODAY FOR NEW BULLETIN AND DIMENSION SHEET

No. 4-A
Self-Dumping

PENN IRON WORKS, INC.
READING, PENNA

For More Information Circle 706, Page 39

CENTRIFUGALLY CAST

AUTOMOBILE CYLINDER LINERS

DIESEL ENGINE LINERS

BRONZE BUSHINGS

on the new WATER-COOLED Model M-WC
(Illustrated)

Utilizes low cost permanent molds of available steel tubing to produce gray machinable cast iron or bronze bushings.

Water cooled molds can be maintained at either high or low temperature easily. High or limited production in very small space with unskilled labor. Completely safe for workmen. Simple, sturdy equipment. Quick changeover from one mold to another. Practically 100% metal yield of high quality, denser castings. Metal porosity eliminated.

Write for New Bulletin #257 Illustrating Model M-WC

RESEARCH FACILITIES

We have available an Experimental Foundry equipped for ferrous and non-ferrous melting for both vertical and horizontal centrifugal casting production. Our facilities are available to foundries for research or trial centrifugal castings at low cost.

Centrifugal Casting Machine Co.
P. O. Box 947 **Tulsa 1, Okla.**

For More Information Circle 707, Page 39

You get MORE with

MOROC®

the controlled silicate CO_2 binder

MORE SPEED. Curing time ranges from ten seconds to three minutes, depending on type of mold or core.

MORE LABOR SAVING. Cores are ready for use when they come from core box. You eliminate movement to and from ovens, handling of core driers, cementing of halves.

MORE FLEXIBILITY. Fast curing means faster handling of rush orders. There's no need to stockpile cores for future orders. You have the flexibility to meet customer needs on schedule.

MORE PROFIT. With MOROC you can get this extra capacity and flexibility with a smaller investment in equipment than would be required for additional ovens or shell-molding equipment.

MOROC COMES IN FOUR GRADES

MOROC 1. High-strength binder.

MOROC 2. High-strength and good collapsibility.

MOROC 3. High-strength and high collapsibility to meet demands of core-blowing equipment.

MOROC 4. Extra-high collapsibility and good flowability.

Other Diamond Chemicals for the foundry:
Soda Ash (briquettes & granulars) Caustic Soda, Chlorine, Solvents

Write for complete information. Diamond Alkali Company, 300 Union Commerce Building, Cleveland 14, Ohio.

Diamond Chemicals

For More Information Circle 708, Page 39

GLUTRIN
LIQUID BINDER

GOULAC
DRY BINDER

For

CORE WORK, SAND FACINGS, SPRAYS

Write for pamphlets giving detailed information. Both materials carried in stock by America's foremost foundry jobbers

ROBESON PROCESS COMPANY

(Established 1905)

GENERAL OFFICES: P. O. BOX 960, ERIE, PA. • PLANT: JOHNSONBURG, PA.

For More Information Circle 709, Page 39

2922

MURPHY PISTOL SPRAYER guaranteed

Forces blackening into pores and pockets of molds. Sprays silica wash, oil, or water equally well. Used also to sand blast, to clean automobile and diesel engines, to spray centrifugal molds. Standard of the foundry field for more than 50 years. Priced from $17.25. Write for quantity discounts.

(Also furnished in a deluxe model with air pressure reducing valve, 20' of air hose, and 5' of suction hose, both of superior quality, oil and acid resisting plastic.)

Ask your foundry supply dealer or —

Write for FREE Data Sheet No. 2922

JAMCO

JAS. A. MURPHY & CO., INC.

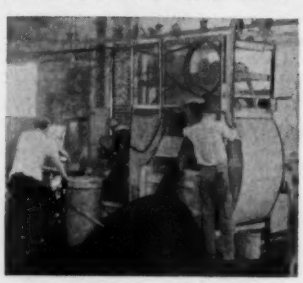
1425 EAST HIGH STREET, HAMILTON, OHIO

For More Information Circle 710, Page 39

The New RINGMULLOR

A Better Way to prepare molding sand!

A completely self-contained, portable sand plant that has everything: gyrating screening, batching, mulling, aeration, optional cooling and magnetic separation. So compact you can now prepare the very best mulled and aerated sand at point-of-use . . . at comparatively low cost. Performance proved in actual foundry operation.



For complete information, send for new Ringmullor Bulletin No. M161.

STATES ENGINEERING CORP.

245 E. MURRAY ST., FORT WAYNE, IND.

For More Information Circle 711, Page 39

HIGH QUALITY SILICA QUARTZITE PEBBLES

HIGH QUALITY • LOW ALUMINA

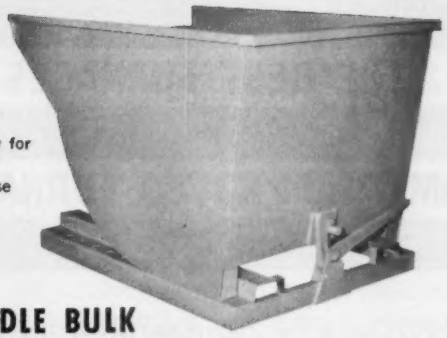
FINELY GRADED TO DESIRED SIZE

R. W. SIDLEY, INC.

TELEPHONE CY 8-3232

THOMPSON, OHIO

For More Information Circle 712, Page 39



¾ yd. capacity for fork lift truck use

HANDLE BULK MATERIALS WITH ECONOMY AND EASE IN CHASE DUMP HOPPERS

Sturdy construction and careful balance make this self-dumping hopper ideal for handling bulk materials, parts, scrap, etc. Models for use with platform or fork lift truck. All welded construction, using 3/16" steel plate. One man can operate the hopper alone — the hopper automatically dumps and returns to locked upright position. Special styles may be stacked full or empty. Sizes to suit your needs. Write for catalog sheet and prices.

Chase FOUNDRY & MANUFACTURING CO.

2900 Parsons Avenue • Columbus 7, Ohio

For More Information Circle 713, Page 39

FOUNDRY CONSULTANTS

APPRAISALS . . . WAGE INCENTIVE PLANS . . . COST SYSTEMS . . . EXECUTIVE CONTROL . . METHODS PRODUCTION CONTROL SYSTEMS . . . PLANT REMODELING . . PLANT DESIGN . . CONTINUOUS SYSTEMS . . . SEMI-CONTINUOUS SYSTEMS . . . PRESENT OPERATION MODERNIZED

EDWIN S. CARMAN, INC.

1645 LEE ROAD CLEVELAND 18, OHIO

For More Information Circle 714, Page 39

NON-FERROUS FOUNDRY METALLURGY

By A. J. Murphy

Covers the general principles unifying foundry techniques of all industrial nonferrous metals in relation to metals in the liquid state to the process of solidification and to the factors influencing properties of casting. Other materials include the part played by gas dissolved in liquid metals, its control and its influence on cast products, factors influencing the grain size of castings, and mechanical properties of castings as complete components compared with the properties in conventional test samples.

497 pages Price $12.50 Postpaid

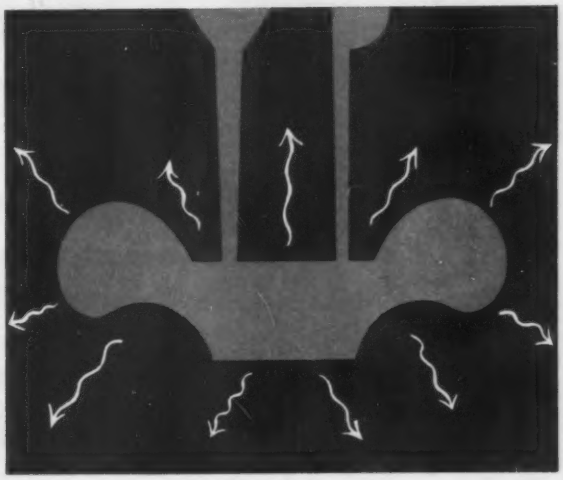
FOUNDRY Book Dept.
1213 W. 3rd St., Cleveland 13, Ohio

For More Information Circle 715, Page 39

M&T

OREFRACTION

Zircons remove heat faster



Orefraction zircon sand conducts heat away from castings three times faster than silica sand. This property permits directional solidification of castings. Withstanding higher temperatures as well, zircon eliminates burn-in problems, especially where you have deep pockets or thin cores, and heavy sections.

In addition, Orefraction zircon toughens molds against impingement of molten metal. It gives better dimensional control. And zircon wash on the mold surface will give you an exceptionally smooth and clean casting.

Available as sand and as flour of 140, 200, 325, 400 and 600 mesh—all of recognized purity and uniformity. Ask us for the name of your local distributor of M&T Orefraction Zircons.

M&T OREFRACTION PRODUCTS

METAL & THERMIT CORPORATION General Offices: Rahway, N. J.
In Canada: M&T Products of Canada Ltd., Rexdale, Ontario

For More Information Circle 716, Page 39

FOR THE BEST RESULTS...THE BEST FURNACES

HAUSFELD CUSTOMER APPROVED FURNACES

for Brass or Bronze Melting gas or oil fuel operated.

Forty-four years of continuous emphasis on quality, under the same name and ownership, have made Hausfeld furnaces a product customers reorder with confidence, and more significantly, recommend to others. Write today for Bulletin.

THE CAMPBELL-HAUSFELD COMPANY
300-I Moore St. Harrison, Ohio

CAMPBELL-HAUSFELD Metal Melting Furnaces

For More Information Circle 717, Page 39

BOTTOM BOARDS
MAGNESIUM
OR
ALUMINUM

We can supply any requirement. • Nearly 100 of our own patterns . . . or we'll use yours • Prompt Delivery • Phone or write for sizes and prices . . . and get our bid last!

MAG-ALCO Foundry

1640 N. Telegraph Rd., Pontiac, Michigan
FE: 4-8592

DIETERT DETROIT

automation equipment for production sand systems

Sand, Core, Shell and Mold Testing Equipment
CARBON and SULFUR DETERMINATORS

DIETERT DETROIT

DIETERT DETROIT

HARRY W. DIETERT CO.
9330 ROSELAWN AVE.
DETROIT 4, MICHIGAN

For More Information Circle 719, Page 39

EMPIRE*
"THAT GOOD" FOUNDRY COKE

DEBARDELEBEN COAL CORPORATION
2201 First Ave., North • Birmingham 3, Ala.
Phone: ALpine 1-9135
*Reg. U. S. Pat. Off.

For More Information Circle 718, Page 39

For More Information Circle 720, Page 39

THE PROFITABLE ANSWER . . . . . to rising costs is an effective method and production engineering program

Our professional foundry engineering staff is successfully helping management to increase productivity—increase wages —reduce costs.
We are proud of the results obtained for our foundry clients.
Discussing our services involves no obligation or expense.
Information and references available upon request.

D. C. LATELLA & ASSOCIATES, INC. Consulting Engineers

624 WIDENER BLDG., PHILADELPHIA 7, PA. LOCUST 7-3372

For More Information Circle 721, Page 39

HARTLEY CONTROLS CORPORATION
NEENAH • WISCONSIN
Originators of Fully Automated Sand Systems for Foundries

For More Information Circle 722, Page 39

CLASSIFIED ADVERTISING

• HELP WANTED

ASSISTANT SUPERINTENDENT

Must be able to assume full responsibility and supervision of producing miscellaneous types of small gray iron castings. Job will require full knowledge of cope and drag work, match plate, pouring, sand control and core work.

This is an excellent opportunity for the right man between the ages of 35 and 45 for future advancement.

Send full resume of past experience and salary requirements to:

Personnel Director
MUSKEGON PISTON RING COMPANY
EAST GARDNER STREET
SPARTA, MICHIGAN

SUPERINTENDENT

. . . to manage foundry operations for a company producing castings for its own use and embarked on an expansion program. This position is of a permanent nature. Must be experienced in gray iron foundry and have knowledge of metallurgical practices and scheduling. Please submit complete resume and desired salary, in confidence, to:

F-34, P. O. BOX 2069
PHILADELPHIA 3, PENNSYLVANIA

SENIOR INDUSTRIAL ENGINEER

Excellent growth opportunity. Must have background in standard data, estimating and methods. Midwestern foundry location.

BOX 192, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

MAINTENANCE FOREMAN

Semi-mechanized gray iron foundry. 180 Employees. Must be experienced in all phases of foundry maintenance. Must be familiar with Apron Conveyors, Shakeouts, Air Compressors, Core Blowers, Molding Machines, etc. Address: Box 206, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

• HELP WANTED

NONFERROUS PLANT METALLURGIST

Aggressive southern manufacturer is seeking a nonferrous plant metallurgist, who is experienced in all phases of the production of quality bronze alloy and aluminum alloy castings. We want a man who will be able to recognize the existence of a problem and come up with a solution for same, one who is energetic and practical and who can act as a consultant to the foundry superintendent and to management on all problems pertaining to foundry on nonferrous questions.
We would prefer a man under 35 years of age, will offer a salary between $8000.00 and $9000.00 per year with opportunity for advancement on the basis of proven worth and top performance. All replies strictly confidential

BOX 173, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

MAINTENANCE FOREMAN-ELECTRICAL

Leading steel foundry in the East will have position available for a man thoroughly qualified to handle a variety of problems in electrical maintenance and new installations.
All candidates must have well diversified experience ranging from electronics to high tension work and be fully acquainted with modern maintenance management techniques. He must be able to get maximum productivity from his people.
For all this the man of our choice will be paid well, have good employee benefits with lots of challenge and opportunity for the future. Complete resumes should be addressed to:

BOX 178, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRY LAYOUT ENGINEER

Leading foundry equipment manufacturer needs foundry layout engineer. Should have experience in laying out all types of foundry equipment, material handling and material flows. Excellent salary commensurate with ability. Address: Box 189, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GENERAL SUPERVISOR

To head up scrap control program in Indiana gray iron foundry. Send resume and expected salary to: Box 163, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GAS FURNACE MELTER

For gray iron in medium size gas fired melting furnace, for a jobbing foundry in north central Ohio. Preferably someone who also has some cupola melting experience. Address: Box 188, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

• HELP WANTED

MELTER FOREMAN

Acid electric furnace. Must have ability to supervise melting, pouring and shake-out crews.

BOX 204, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

PRODUCTION AND QUALITY CONTROL SUPERVISOR

To supervise the department of our plant making Ni-Resist and Ductile irons using induction furnaces. The person should have proven administrative record with a minimum of six years foundry experiences. Age 28 to 40. Man of action. Must know how to get things done. Excellent opportunity and top wages. Engineering degree not necessary.

NOBLESVILLE CASTING COMPANY, INC.
NOBLESVILLE, INDIANA
Telephone: Westfield, Indiana #3-3285
between 7 & 9 p.m.

FOUNDRY SUPERVISOR

Medium sized gray-iron and ductile foundry in Central Ohio needs man experienced in incentives, pattern operations, methods, and scheduling. Excellent opportunity. Replies answered and confidential. Address: Box 160, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOREMAN

To supervise bench, squeezer molding and pour-off department. State qualifications and salary requirements. Steel foundry located in midwest. Address: Box 159, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SALES ENGINEER
30-40 YRS.

To cover Minnesota, Wisconsin, Iowa and N. Illinois for leading manufacturer of core binders. Salary, plus bonus benefits.

BOX 168, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

• HELP WANTED

FOUNDRY METALLURGIST

Degree or equal—25 to 35 years of age—4 years' or more experience in steel or gray iron. Knowledge of heat treating, melting and sand technology desirable. Apply Personnel Department. . .

GUNITE FOUNDRIES DIV.
KELSEY-HAYES CO.
301 PEOPLES AVE. ROCKFORD, ILL.

TOPNOTCH MOLDING FOREMAN

For jobbing steel foundry in Texas. Must know pattern layout, heading, and gating, and sand control. Salary: $6,000.00 per year. Address: Box 162, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERVISOR FOR LARGE AND SMALL COREROOM

Must have good knowledge of floor, bench, and blower machine coremaking operations. Midwest steel foundry. Address: Box 158, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY ENGINEER

Should have considerable and varied experience with equipment, layout, methods and material flows. For interview in Chicago send complete information on education, employment history, personal data and family status. Replies will be held confidential. Address: Box 187, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SALES—METALLURGICAL PRODUCTS

Sales engineer with technical background, willing to travel. Well established products in steel foundry and heat treating fields. Send resume and salary requirements. Address: Box 175, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

METALLURGIST

Required by Canadian steel foundry. Must have knowledge of heat treating, melting and sand technology. Replies confidential. Reply to: Box 169, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT FOREMAN

Small jobbing gray iron foundry in New York City area, seeks practical man with some technical background. Will work directly in shop with present long term organization to improve supervision and methods.

BOX 166, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

• POSITIONS WANTED

DESIGNER OF PERMANENT MOLDS

Specialist in missile and aircraft castings of Aluminum and Magnesium. Location New York —New England area. Address Box 179, FOUNDRY. Penton Bldg., Cleveland 13, Ohio.

FOUNDRY MANAGEMENT

Graduate engineer, age 30, with M.S. degree and general foundry-machining background seeks management position with progressive company. Have practical and technical experience as engineer, superintendent, sales engineer. Know latest methods, administrative controls, and sales techniques. Address: Box 170, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY EXECUTIVE
SALES OR MANUFACTURING

Registered professional engineer, metallurgical graduate, twenty years' experience in sales, manufacturing and research, both ferrous and nonferrous. Considerable customer contacts, estimating and trouble-shooting. Well versed in all foundry practices, including, sand, shell, furan, CO_2 investment, plaster and waterless molding sand. Can produce aircraft quality castings. Age 49. Now employed. Will relocate. Reply, Box 207, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SALES ENGINEER

Successful engineer with sales, customer contact and production background desires creative sales position with a foundry or a foundry equipment manufacturer. Address: Box 195, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT—GENERAL FOREMAN

Practical and technical; presently employed in the East; over 30 years' experience; jobbing or production to 5 tons. Address: Box 167, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRYMAN

With originality and imagination—nonferrous metals. Plaster molding techniques is my strong feature. I have set up two plaster foundries successfully, looking for the third. Did consulting and extensive experimental work. Address: Box 164, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

• POSITIONS WANTED

SUPERINTENDENT OR MANAGER

Young foundryman thoroughly versed in all gray iron operations. Degree in Metallurgical Engineering. Interested in responsible position with opportunity. Address: Box 199, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

ALL-AROUND FOUNDRYMAN

Twenty-five years' experience in gray iron: costs, melting, core, molding, gating and risering, metallurgy, selling and labor relations. Forty-five years' old and in excellent health. Will relocate. Address: Box 190, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRYMAN

Excellent background in core room, cupola, molding, cleaning and maintenance—iron and steel. Presently employed as General Foundry Foreman. Will relocate. Age 33. Address: Box 196, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

STEEL FOUNDRY METALLURGIST

B.S. in metallurgical engineering. Age 39. Married, have three children. Thirteen years' steel experience, eight years' chief metallurgist. Thorough knowledge of foundry melting, molding, cleaning, inspection, sands, chemical and physical testing, heat treating, and nondestructive testing methods. Desire position as chief or plant metallurgist in progressive foundry. Will relocate but prefer midwest or eastern location. Available immediately. Address: Box 180, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

COREROOM SUPERINTENDENT

Or Coreroom Foreman. Nineteen years' experience in gray iron foundry. Age 43. Married with family. Jobbing or production, bench or floor work. Qualified to take complete charge of all coreroom operations. Willing to relocate. Address: Box 176, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

METALLURGIST

Have over 20 years' experience in acid and basic cupola and general foundry. What have you in Chicago radius? Address: Box 185, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

PATTERN SHOP SUPERINTENDENT

Young man; experienced supervisor; good foundry background; wood, metal and plastic pattern experience. Address: Box 198, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

CASTING SALES

Graduate mechanical engineer seeks position in casting sales in Midwest area. Four years' experience with alloy gray iron and steel foundries as design engineer and molding foreman Presently employed in technical sales. Age 25. Address: Box 197, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MANAGEMENT ASSISTANT

Experience in all duties of management including time-study and incentives. Aluminum and gray iron foundry experience. Resume sent upon request. Address: Box 182, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

YOUNG GRADUATE METALLURGIST

With four years' aluminum foundry experience. Military obligation fulfilled. Desire position with responsibility and potential. Midwest location. Address: Box 208, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY POSITION

Foreman, time study and management background. Capable supervisory experience. Desires position in West Coast area. Age: 40. Address: Box 186, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MANAGEMENT

Young, aggressive, mechanical engineer with ten years' ferrous experience, mostly in supervision and trouble shooting, invites a challenging position. Excellent references and presently employed. Address: Box 194, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Twenty-nine years' experience, ferrous and nonferrous, over ten years in ductile iron. Cost reduction a specialty. Now employed. Best references. Resume on request. Address: Box 161, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT-MANAGER

Twenty-five years' diversified experience in all types of ferrous metals. Large and small, production or jobbing. Administrative, technical and practical training. Capable consultant. Excellent labor relations and references. Now employed. Age 48. Address: Box 181, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MELTING FOREMAN—MELTER

Steel foundry, electric arc furnaces, basic or acid practice. Carbon, alloy and stainless steels. Capable of taking full charge including budget and incentive systems. Address: Box 210, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

• POSITIONS WANTED

MANAGER

Metallurgist with excellent foundry background and good management experience seeks opportunity with growing, progressive foundry. Experience includes foundry supervision and management, production control, quality control, purchasing, research, plus early trades training. Present earnings in low five figures. Address: Box 203, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY FOREMAN

Experienced foundryman with floor, machine molding, and core room supervisory experience. Stainless steel and iron. Green or dry sand molding. Versed in gating, risering, CO_2 core making and production procedure. Address: Box 209, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

ENGINEER

Available for responsible position with foundry or engineering staff. Age 38. Fourteen years of diversified experience from foundries in Europe and U.S.A. Plant and equipment engineering, quality control. Address: Box 200, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

POSITION WANTED

Time Study and Methods Engineer, Seventeen years' experience; twelve years in C.I. and D.I. foundry. Do all estimating. Eight years as department head. Desire relocation. Resume on request. Address: Box 165, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

PROFIT—DOMINATED

Hard-driving and versatile foundryman desires demanding position as manager's assistant or superintendent. Fourteen years of diversified gray iron jobbing and production experience. Journeyman. Engineer graduate with added business education. Young familyman. Will go anywhere.

BOX 184, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRYMAN

Practical and Technical. Would like real challenge. Will relocate. Address: Box 205, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

• REPRESENTATIVES WANTED

AGENT WANTED FOR CHICAGO AREA

Man with two or three items calling on foundries in Chicago and Northern Illinois area. Commission. Give qualifications and reference in reply.

BOX 156, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

SALES REPRESENTATIVE

We are interested in securing the services, on a salary plus travel expense basis, of an aggressive sales engineer to contact and sell the foundry trade. Must have a metallurgical background or equivalent practical foundry experience. Our company is prominent in its field, presently selling a widely used product to all types of foundries.
Man desired should not be over 40 years of age, preferably 30 to 35, free to travel extensively. Headquarters in a medium size midwestern town with moving expenses paid.
Send complete resume on education and experience and salary requirements. All inquiries held in strictest confidence. Please reply to:

BOX 174, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

CASTING SALESMAN

We are interested in a high caliber salesman who is presently employed. Must be qualified in engineering gray iron, steel and alloy castings and patterns. Established western firm offers unlimited opportunities. Give resume, references and availability.

BOX 211, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

• ACCOUNTS WANTED

MANUFACTURER'S AGENT

R. G. DYER COMPANY, 114 Dolly Lane, Chalfont, Pennsylvania. Phone: Van Dyke 2-9644. Would like one or two reputable lines to sell to the foundries and steel mill trade. Territory covering eastern Pennsylvania, southeast New York and New Jersey for the past 14 years.

• EMPLOYMENT SERVICE

FOUNDRY PERSONNEL SPECIALISTS
National Placement and Procurement of
GENERAL AND PLANT MANAGERS, PLANT SUPERINTENDENTS, FOREMEN—ALL DEPARTMENTS, METALLURGISTS, ENGINEERS, CONTROLLERS, ACCOUNTANTS, SALESMEN, SALES MANAGERS, PERSONNEL DIRECTORS, PURCHASING AGENTS
Confidential Inquiries Invited
From Employers and Qualified Applicants
For Fast Competent Assistance Contact
DRAKE PERSONNEL, INC. **FINANCIAL 6-8700**
JOHN COPE, DIRECTOR, 29 E. MADISON ST., CHICAGO 2, ILL.

• CONSULTANTS

CONSULTANT
Expert assistance in foundry operations gray iron, malleable iron and steel. Address: HERBERT F. MILLER, 589 Trade Winds Drive, Dunedin, Florida.

• FOUNDRIES WANTED

FOUNDRY WANTED
Ex-foundry group desires to purchase small or medium sized iron or aluminum foundry in Indiana, Illinois or Wisconsin. Replies confidential. Address: Box 183, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

• WANTED-TO-BUY

SPEEDMULLORS WANTED

Need Model 60 or 70 Speedmullors.

Reasonable operating condition.

BOX 171, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

WANTED

One (1) SPO #30 layout protractor table.

Two (2) BEARDSLEY & PIPER, Champion, Model NCR-10-PSA, roll in—roll out 500 lb rollover capacity Rol-A-Cor machines.

One (1) BEARDSLEY & PIPER CB-15-C Flexiblo Coreblower (later than 1955), blown sand capacity 80 lbs., adjustable daylight 8-18", magazine area 15" x 28".

One (1) type KCH-3D portable MAGNAFLUX unit.

When replying include model numbers, serial numbers and describe auxiliary equipment included.

BOX 155, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

• FOUNDRY FOR SALE

FOUNDRY FOR SALE
Small gray iron foundry, 20 to 30 employees. Capacity 6 to 8 tons daily. Now operating. Located eastern New York. Address: Box 193, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MICHIGAN FOUNDRY

Fully equipped mechanized gray iron foundry in Grand Rapids, Michigan for sale. Both cope and drag and squeezer systems. Good buildings on five acres of land.

BOX 202, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

• FOUNDRY FOR SALE

BRASS AND ALUMINUM FOUNDRY
Now operating. Also equipped for gray iron. 10,500 square feet floor space. Located in central Indiana adjacent to railroad siding. All facilities available. Ideal for light manufacturing. $24,000 Price. Address: Box 172, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

NONFERROUS FOUNDRY FOR SALE

$500,000. Main plant established in 1948 in Bogota, Colombia. Company has five branches. Foundry employment is 70. Foundry and warehouse buildings have 40,000 square feet. Company products are marketed in Colombia, Ecuador, Venezuela. Major products are: Copper alloy, lead, Linotype metal, aluminum ingot, railroad bearings, anodes, bells, and specialty items. Production equipment includes 17 furnaces with capacity of 300 tons weekly; horizontal and vertical Rotomet centrifugal castings, complete modern machine shop, and eight trucks. 1960 gross sales amounted to $50,000 monthly.

WRITE OR CABLE
DISTRAM
APTO. AEREO 79—94
BOGOTA 1, D. E.

• FOR SALE

SHELL CORE MACHINES

2—SPO SC-30A-1 fully automatic Holo Core Machines.
Used 1½ years. Excellent condition.
18 x 22 gas fired platen. .....$2900.00 each.

NOBLESVILLE CASTING CO., INC.
NOBLESVILLE, INDIANA

FLASKS . . . . FLASKS . . . . FLASKS

We have hundreds of good used flasks and jackets in all sizes.
SAVE TIME AND MONEY!
Write for our latest Flask list.

INTERNATIONAL FOUNDRY SUPPLY COMPANY
P. O. BOX 1033, READING, PENNSYLVANIA
PHONE: FR 6-0794

FOR SALE

1 2½ KVA Norelco Industrial X-ray & Fluoroscope Unit. Good Condition!

MEECH FOUNDRY INC.
9906 MEECH AVE. CLEVELAND 5, OHIO
PHONE: MICHIGAN 1-5550

FOR SALE

960 Cycle Induction Melting Furnaces—Like new!
2500 lbs capacity—2 units.
1000 lbs capacity—1 unit.
Power supply not available.
We would consider any reasonable offer.

SABIN METAL CORPORATION
310 MESEROLE STREET BROOKLYN 6, N. Y.

FOR SALE

12 x 10 Chicago Pneumatic Compressor with 60 H.P. Motor. Capacity 300 CFM. Compressor completely overhauled. Excellent condition. Price $1,450.00 f.o.b. Alpena. Address: THUNDER BAY MFG. CORPORATION, Alpena, Michigan. Phone: ELMWOOD 4-3181.

LIQUIDATION of former ALLIS-CHALMERS No. 2 FOUNDRY

ALL items moved to our Chicago warehouse. No more time left to sell on premises

JEFFREY APRON CONVEYORS
(1) 36" wide x 48" long
(2) 42" wide x 12'7"

BELT CONVEYORS
18" and 24" wide

BLAST CLEANING MACHINES
AM. continuous on 2 belts 25' long, 2 heads.
AM. 36 x 42 with skip.

CORE BLOWERS
INT. SB 11, universal head
CHAMPION CB15, univ. head

CORE OVENS
Dielectric 20 KW

CRANES
WHITING cupola charging, 3½ ton

CRANE BUCKETS
HAYWORTH electric, 1 yd. D.C.

DUST COLLECTORS
AM. dustube, many sizes
WHITING hydro clone
NEWCOMB-DETROIT

FURNACE
WHITING 25 ton cradle furnace complete with pulverizer and all necessary equipment

HOISTS
I-R air hoists 1 and 2 ton

JOLT SQUEEZERS
MILWAUKEE 103, table 17x21
INT. LHS 12", table 17x20
OSBORN model 275PJ, table 16x21

JOLT SQUEEZE STRIPPERS
MILWAUKEE model 123, table 21x27
INT. PK18 table 24x36
SPO model 2136, table 22x30

LADLES
LIP pour, enclosed gear 29x29 Cylindrical, 27x35

MAGNETIC BELT CONVEYORS
JEFFREY 24" with Dings pulley

PAYLOADERS
MICHIGAN ¾ yd.

MOLD CONVEYORS
JEFFREY 352' long, cars 88, size 23x41, with cooling tunnel
JEFFREY 509' long, cars 101, size 35x44, with cooling tunnel

MULLERS
(3) SIMPSON No. 3, enclosed gear

SCALES
FAIRBANKS dial type, 10,500 cap. and 21,250 lb. cap.
Crane scale 10,500 cap.

SCREENS, VIBRATING
ALLIS CHALMERS 3 x 6
ALLIS CHALMERS 4 x 8

SAND CONDITIONER
ROYER Model DS 29

SWING GRINDERS
SAFETY 7½ hp.
FOX 10 hp.
MARSCHKE 15 hp.

TUMBLING BARRELS
WHITING 36" x 72"

Contact Mr. Earl Greene

WEISS STEEL CO., INC.
600 West Jackson Blvd.
Chicago 6, Ill. CE 6-1936

For More Information Circle 866, Page 39

FOUNDRY EQUIPMENT

Simpson Muller Ser. 113155—1-F-UD 1955 — C/W — Skip Hoist, Water Meter; T. E. Mtr. 7½ HP—220/440—1750 RPM.

Beardsley & Piper #50-A Speed Muller Ser. 215-5406—C/W Skip Hoist, Water Meter, Etc., Installed 1955 9 cu. ft. Cap. T.E. 50HP Mtr.

Beardsley & Piper #60 Sand Preparator—Ser. 215-5406 installed in 1955

Beardsley & Piper—Motive Jr. Installed 1950—1st. Arm—12′ Ramming Unit 4′, 19″ Head W/4″ Tip—2 Speed 13/20 HP 1200/1800 RPM. Arm. Mtr. 2 HP-950 RPM C/W Magnetic Separator—Rectifier Elevator & (2) 200 cu. ft. Crane Type Hoppers, 300′ Cable Reel.

Beardsley & Piper Mulbaro's 3½ cu. ft. (1)—W/6 Extra Barrels

American Wheelabrator — 72″ Swing Table installed 1952—Exc. Condition W/Dust Collector

1—American Wheelabrator Dust Collector KD-45

Hyster Karry Krane 10,000 lbs. Cap. Lift Speed 35′ F.P.M.

1—Towmotor—Ser. 680 P 60005—1960—Spec. #332 Model 680 DLP Lift 120″—Cap. 8000# at 24″ Load Center, 48″ Forks, Propane Fuel.

Hough Payloader Model—HA—Ser. 26712—Pneumatic Tire

Clam Shell C. H. Williams Eng. H.O. Single Action

American-Model "F" Core Rod Straightener ⅜″ x 1¼″—Shears ¾″ Forms ⅝″ Gaggers (New Never-Used).

Fox Grinder 220/440 60cy. 10 H.P. Wheel size-24″ Dia., 3″ Wide, 12″ arbor.

Cupola Charging Unit—6000# Yale Extended arm Cupola Charge Hoist, single Beam type 26′ W/power Trolley, W/Swivel rail to charge 2 cupolas, 35′ tower.

Magnet—52″ Diameter Cutler Hammer

Miscellaneous

Core Rod, 10,000 lbs. Pneumatic Hoist, core Plates, Flask, Molding Machines, Ladle (6), Lockers, (like new) Electric Hoist, Screenarator (Model S) Foxboro air Wt. Control, Positive Blower 24 & 33 cu. ft. displacement, Rodcutter, Chippers, rammers, drop Balls, 100 ton sand storage.

RIVERSIDE IRON WORKS
10640 So. Buffalo
Chicago 17, Illinois
Telephone—374-1322

For More Information Circle 867, Page 39

• FOR SALE

SWING GRINDERS
FOR SALE
(Used—Excellent condition!)

FOX 10 hp. 3/60/220/440 volt takes up to 18″ x 2″ wheel $650.00
MARSCHKE 15 hp. 220-440 V. takes up to 24″ wheel .....$750.00 each

C. GREENE EQUIPMENT CORP.
4014 W. 24th ST.
CHICAGO 23, ILLINOIS
LAFAYETTE 1-1322

FOR SALE

Pangborn Rotoblast 9LG14 with No. 632 dust collector and No. 8KX exhauster. Late model. Priced for quick sale.

BOX 191, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

REVERBALE JR.

Type 1, 14″ basin melting furnace. Complete with Minneapolis-Honeywell automatic temperature control. For gas or oil firing. Spare set of bricks included. Price $1500. Address: Box 177, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

REPAIR AND REBUILDING SERVICE ON ALL PNEUMATIC TOOLS

We try to carry a complete line of "Hard Chrome Rebuilt Tools" at about half the cost of new tools. Before you discard your old tools, why not send them to us for our estimate on the cost of renewing them with our Hard Chrome Process?

CENTRAL PNEUMATIC SERVICE, INC.
512 LINDEN AVENUE
DAYTON 3, OHIO
PHONE: CL 2-2761

FOR SALE

#918 Johnston & Jennings Molding Machine	$1250.00
#815 Johnston & Jennings Molding Machine	$ 750.00
10 HP U. S. 3 speed Snag Grinder	$ 275.00
American Wheelabrator—Size 15 x 20	$1500.00
Lindberg Aluminum Melting Furnace—2 chamber	Offer
Model 1800 Dielectric Core Ovens	Offer
Drawer Type Core Oven	Offer

BALCHER MACHINERY COMPANY
5715 EUCLID AVE.
CLEVELAND 10, OHIO
TELEPHONE: ENDICOTT 1-0420

G-U-A-R-A-N-T-E-E-D
SAND BLAST EQUIPMENT
SELL BUY TRADE
TERMS AVAILABLE

Designers and Erectors of Specialized Blast Equipment

4′ Wheelabrator Table Blast	$2250.00
8′ Wheelabrator Table Blast	2750.00
6′ Wheelabrator Table Room	6000.00
6′ Wheelabrator Air Table	1700.00
48 x 48 Wheelabrator Tumblast	3000.00
42 x 48 Wheelabrator Tumblast	2750.00
36 x 42 Wheelabrator Tumblast	1500.00
27 x 36 Wheelabrator, new rubber belt	3000.00
4′ Sly Air Table	600.00
Sly Air bbl #4	350.00
9 LG Pangborn Table w/6-36″ Spinners	4000.00
6′ LG Pangborn Table, Late	3000.00
6′ Pangborn Swing Table, Like New	6000.00
Pangborn 53 EN-2 Hand Cabinet	325.00
Rumelin 8 x 8 Room	1000.00
Pressure Tanks, all types	$150.00 up
Vapor Blast Cabinets	400.00
Vapor Blast Automatic Table	2500.00

All types and sizes of Hand Cabinets, Dust Collectors, Pressure Tanks, Rooms, Horizontal or Vertical Tumbling Barrels and Additional Sand Blast Equipment too numerous to mention.

$100,000 worth of Wheelabrator and Pangborn Spare Parts Priced 25% to 50% Less List.

170 STEEL SHOT MIXED WITH G80 STEEL GRIT .....$125.00 ton

DIAMOND SAND BLAST EQUIPMENT CO.
5654 W. Jefferson Ave.
DETROIT 9, MICHIGAN
VI-3-6750

• FOR SALE

FOR SALE

OSBORN 275J Portable (16 x 20 table) and 559 Jolt Pin Lift (25 x 30 table) Molding Machines. Both A-1.
MULBARO 3½ B&P, reconditioned and in A-1 shape.
MOLDERS FRIEND w/60″ brush and extra brush. Rebuilt and guaranteed.
SANDSLINGERS (2) 16 x 4 and 19 x 4. Both rebuilt and guaranteed. **Reasonable.**
CORE OVEN Porbeck Dbl. drawer 48 x 60. Excellent.
SHAKEOUT Hewitt-Robins 4′ x 6′. Excellent condition.
CUPOLA BLOWER GE 5400 w/50 h.p. motor, recently taken out of service and in good condition.
SKIP HOIST CHARGER for #7 or smaller cupola. Good buy.
"We lean over backward—or forward—to please you!"

McMAHON AND COMPANY, INCORPORATED
P.O. BOX 3014A AVONDALE STATION
BIRMINGHAM 12, ALABAMA
PHONE 592-4201

FOR SALE

One model 2½F SIMPSON mix-muller, approximately 40 cu. ft. capacity, complete with dust hood and 60 h.p. motor. Excellent condition. Used 3 years. Address: Box 201, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

C. GREENE EQUIPMENT CORP.
GOOD USED
FOUNDRY EQUIPMENT

SPO Jolt, Squeeze Pin Lift, model 2138C
SPO Model 9546 Jolt, squeeze, rollover draw
Simpson No. 1½ UD Muller
Simpson No. 3 Enclosed gear Muller
Simpson No. 1 Open gear Muller
Osborn squeezer 276J and PJ
(3) Pig Mold Conveyors
American Tumblast 36 x 42 w/skip
J & J Model 918 Rollover
Herman 6,000 lb. Jolt Rollover
Sutter Core Rollover
International Model 30 x 8 Rollovers
International Model 24 x 10 Rollovers
International Jolt pin lifts all sizes
J & J Model 812S Jolt pin Lifts Table 30 x 38
SPO Rollover pattern draw Model RD 6815 table 36 x 68 draw 15″
International plain jolt machines all sizes
International core blowers all sizes
Champion core blower Model CB 10
International hand operated pin push ups
Robbins shakeout 4 x 6 and 6 x 10
Pangborn Table cleaning machine Model LG6 with 6′ table and 24″ aux. tables complete with Dust Collector
Ingersoll-Rand 100 hp Air Compressor
Air Compressors 25 hp.
Whiting coal pulverizer Model 30 complete
Whiting coal pulverizer Model 30A complete
Dust Collectors many sizes
Fisher Aluminum Melting Furnaces 1000 lb cap.
Fisher Aluminum Melting Furnace 300 lb cap. motorized nose pour gas fired
Bondactor Model 1000L
Tessmer sprue cutters
Hough Payloaders Model HA ½ yard
Tractomotive payloader ¾ yd. cap.
Air hoists 1000 lb. to 4000 lb.
Ladles all sizes
Steel flasks all sizes
Core ovens all sizes
Beardsley & Piper Tractor type slinger

Many More Items Available
WE SOLICIT YOUR INQUIRIES
WE BUY WE SELL WE TRADE

C. GREENE EQUIPMENT CORP.
4014 W. 24th St.
CHICAGO 23, ILLINOIS
LAFAYETTE 1-1322

EUCLID FOUNDRY & MACHINE EQUIPMENT CO.

14919 SARANAC ROAD — CLEVELAND 10, OHIO

AIR HOISTS

5—300 lbs. I-R "Air-Block" Type LC3
4—500 lbs. I-R Air hoists Model A
4—1000 lbs. I-R Air hoists Model B
1—4000 lbs. I-R Air hoists Model D
1—6000 lbs. I-R Air hoist Model D-6
2—5 ton I-R Air hoists Model E
1—8 ton Detroit Air hoist
6—Curtis Pendant Class G 1 to 3 ton
12—Hanna Pendant 100 lbs. to 1000 lbs.

HOISTS ELECTRIC

1—1 ton Cleveland Tramrail 220/3/60
1—1 ton Chisholm-Moore 220/3/60
1—2 ton Yale 230 V. D.C.

ROLLER CONVEYOR

1500 ft. 16", 18", 24", 30", 36"

FURNACES (oil & gas fired)

Hausfeld, Fisher, Monarch
#100 to #3000 Stationary & tilting

ELECTRIC FURNACES

1—500# Lectromelt, 225 KVA, 2200 to 191 volts
1—1 ton Heroult, 800 KVA, 4300 to 300-225-178 volts

HEAT TREAT FURNACES

1—Lindberg Type 3854 EHV, 107 KW
1—Lindberg Type 6060 EH, 90 KW
1—Lindberg Car Type 72" x 84" x 96" 105 KW

CORE OVENS

1—Thermonic Dielectric Model M800A, 30 KW
1—Coleman Tower 40' high, gas fired
1—Porbeck 8 drawers, oil fired

SHAKEOUTS

1—Hewitt-Robins 12' x 10' 60,000 lbs. cap.
1—Hewitt-Robins 12' x 20' 65 tons cap.

SANDSLINGERS

1—B-P Stationary Riddle Type 19" head, 4" tip
1—B-P Stationary double belt 19" head, 4" tip

SAND MULLERS

Simpson
1—#0, Type "C" 1¾ cuft.
2—#1, Unit drive 4 cuft.
1—#1½, Unit drive 6 cuft.
2—#2 Type "E" 14 cuft.
2—#3 Unit drive 30 cuft.

Clearfield
2—#610, 14 cuft.
1—#930, 30 cuft.

Brandsley-Piper
2—3½S Mulbaros
1—#50, 14½ to 29 tons per hr.

GRINDING EQUIPMENT

5 to 10 H.P. double end
30" to 53" Horizontal Gardner, Besley
7½ to 15 H.P. Swing Grinders, U. S., Mummert Dixon

SAND CONDITIONERS

B&P Screenarators Model S and M
2—Jeffrey Pugmills
1—American Type AA Sand cutter
1—Moulder's Friend

CORE BLOWERS

Champion, Demmler, International, Osborn, Sand Blo, Redford Taccone, 2 lbs. to 100 lbs. capacity

CUPOLA BLOWERS

Ingersoll-Rand, Roots, Spencer
15 to 75 H.P.

LADLES

3—4 to 6 tons bottom pour Whiting
3—3 ton T-pot
1—1½ ton T-pot
Lip pour ½ to 25 tons

BLAST CLEANING EQUIPMENT

1—42 x 48 Wheelabrator Tumblast
1—48 x 48 Wheelabrator Tumblast
2—26" Wheelabrator Continuous
2—72" Wheelabrator Swingout tables
1—48" Wheelabrator Swingout table
2—6' tables with aux. tables
1—6' Pangborn table, air induction
2—EN2 Pangborn Cabinets

DUST COLLECTORS

American, Sly, Rotocione, Northern 600 to 4000 CFM

HANDY SANDYS and REDDY SANDY

single and double hopper type

HINES POPOFF ALUMINUM FLASKS AND JACKETS

large inventory of various sizes

MOLDING MACHINES

Automatic
2—Taccone's Model TDA-4, 24" x 24"

JOLT ROLLOVER & DRAW

Davenport
1—Model 40A, 3500# cap. 24" draw, 40" x 66" table
2—Model SA28, 1500# cap. 12" draw, 30" x 40" table

Herman
1—10,000 lb. capacity 60" x 72" flask size
1—6000# cap., 40" x 72" table, 40" x 60" bumper
1—750# cap. floor type, 20" x 42" table

International
2—Type "G" 600# cap. 8" draw
2—Type "G" 1000# cap. 10" draw

Johnston & Jennings
2—Model 815, 1200# cap. 15" draw, 30" x 40" table
2—Model 918, 2000# cap. 18" draw, 44" x 54" table

Osborn
4—Model 601 Portable, 10" draw, 24" x 30" flask
2—Model 442 Portable, 10" draw, 600 lbs. cap.
2—Model 444 Portable, 10" draw, 1000 lbs. cap.
2—Model 242 Stationary 12" to 19" draw, 1000 lbs. cap.
1—Model 243 Stationary 12" to 21" draw, 1500 lbs. cap.
1—Model 643 Stationary 17" to 21" draw, 2000 lbs. cap.
4—Model 405 Stationary 18" draw, 3500 lbs. cap.
8—Model 2047-4 Stationary 8" draw

Sps
1—Model 505, 400# cap., 6¼" draw, 18" x 23" table
1—Model 508, 1200# cap., 12" draw, 28" x 30" table

Tabor
1—30" x 40" table, 12" draw, 1000# cap.
1—22" x 32" table, 10" draw, 600# cap.

JOLT, ROLLOVER, SQUEEZE, DRAW

Osborn
1—Model 3161 Rotalift
1—Model 431-4, draw 7", 600# cap.
1—Model 333, draw 9", 750# cap.

Sps
1—Model 917, draw 9", 750# cap.

JOLT, SQUEEZE, PIN LIFT

International
1—LJSK, 12" squeeze cyl., 6" draw
3—PKL, 12" squeeze cyl., 8" draw

Osborn
6—710 PJ, 10" Squeeze cyl., 6" draw
6—712PJ, 12" Squeeze cyl., 6" draw
4—716PJ, 16" Squeeze cyl., 7" draw
1—720U, 11" Squeeze cyl., 4" draw

Sps
2—2114G, 11" Squeeze cyl., 4" draw
2—2136, 13" Squeeze cyl., 6" draw

Milwaukee
2—125-3, 12" Squeeze cyl., 8" draw
1—216, 21" Squeeze cyl., 12" draw

Davenport
1—Model 34AJS, 2500# cap., 12" draw

Herman
1—20" x 36" table, 1500 lbs. cap.
2—36" x 42" table, 4000 lbs. cap.

Johnston & Jennings
1—1216S, 3000 lbs. cap., 16" draw

Osborn
1—561, 40" x 50" table, 12" draw, 5000# cap.
1—560, 32" x 45" table, 12" draw, 2500# cap.
1—540, 29" x 38" table, 12" draw, 2000# cap.
1—558, 20" x 24" table, 4" draw, 550# cap.

Sps
2—3070, 26" x 35" table, 10" draw
1—3058, 23" x 27" table, 8" draw

PLAIN JOLT

Davenport
2—Model AJ-10, 30" x 48" table, 3000# cap.

Osborn
1—Model 103, 54" x 66" table, 6400# cap.

J & J
1—42" x 50" table 5000# cap.

PUSH-OFF

Champion
4—AL 2424, 8" lift, 2000# cap.
1—AL 3036, 6" lift, 3500# cap.

International
1—LP-6, 8" lift, 1000# cap.

CORE ROLLOVER MOLDING MACHINES

International, Osborn, Tabor

JOLT SQUEEZE MOLDING MACHINES

Stationary and Portable, 10", 12", 13", 16" squeeze cyl.

ASK FOR OUR COMPLETE LISTING—CALL GLENVILLE 1-1222

For More Information Circle 868, Page 39

. . . . a trademark to remember . . . . a name to trust . . . . .

FOUNDRY ENGINEERING SERVICE

FOUNDRY EQUIPMENT BY FOUNDRYMEN

HAMLIN-NAGEL, INCORPORATED

Box 192, EDWARDSVILLE, ILLINOIS *In Metropolitan St. Louis*, PHONE 656-3864

SANDSLINGERS

B & P Tractor type, 6' jib, 4' rum arm, 19" head
B & P Stationary Type 6' Jib, 4' Ram Arm, 19" head, 25 HP

SHELL SAND MULLERS

2—B & P No. 3½ Mulbarrows with cycle controls and timers.
2—B & P No. 30 Speedmullers with skip hoists arranged for shell sand.

JOLT SQUEEZERS

Osborn 275J
Osborn 276, 13" Portable and Stationary
International LJS 10"—12"
International PJS 16"
Tabor Top Squeeze 10"
SPO 110J
Champion 10"
Milwaukee 104-5—10"—12"
SPO 2136

JOLT SQUEEZE PIN LIFT

Milwaukee 126 Portable 21 x 27 Table 8" Draw
Milwaukee 145 24 x 30 Table 8" Draw
Milwaukee 195, 28 x 39 table, 10" draw
Osborn 712 18 x 28 Table 6" Draw

2—Milwaukee 195, 28 x 39 table, 10" draw

JOLT ROLLOVER DRAW

International "G" 30 x 12
International "F" 45 x 72 x 16" Draw
J&J 612, 25 x 30 x 8" Draw
J&J 815, 30 x 40 x15" Draw
J&J 918, 44 x 54 table, 18" Draw
J&J 1020B, 50 x 60 table, 20" draw
SPO 506, 24 x 25 table, 10" draw
SPO 508, 28 x 30 x 9" Draw
Tabor 30 x 50 x 12" Draw Shockless

JOLT PIN LIFT

Davenport 34A, 36 x 46 x 12" Draw
J&J 1216S, 36 x 54 x 16" Draw
J&J 688, 24 x 30 x 6" Draw
Milwaukee 1536, 32 x 38 x 10" Draw
Osborn 558 20" x 24" x 5" Draw
SPO 3070

JOLT SQUEEZE ROLLOVER DRAW

SPO 9546, 30 x 40 Flask 11" Draw
SPO 920, 32 x 44 Flask 11" Draw
Osborn 332, 26 x 36 Flask 9" Draw

PLAIN JOLTERS

J&J 72 x 72
Tabor 48" x 60"

SAND MULLERS

Two B&P No. 30 Shell Sand Mullers with Skip Hoists and Dust Hoods, Simpson 24" Lab Muller with Heaters, Cycle Timers for Shell Sand.

Simpson Lab Muller, 24"
Simpson 1½ UD w/or w/o skip hoist
Simpson No. 1, Style "H"
Simpson #2 w/skip (open gear)
Simpson #2 UD w/aerator and skip hoist
Simpson #3 UD auto-cycle, dust hood, etc.
B&P No. 3½ Mulbaro
B&P No. 30 with skip hoist
B&P #60, w or w/o Multromatic
Clearfield 610
B&P 50 with skip hoist, cooling and water meter
Simpson No. 3, Style C, enclosed gear with skip hoist.

SAND CONDITIONERS

B&P Screenerators, M. L.
B&P Junior Night Gang
National Engineering screening and magnetic separation unit
50" Molders Friend
Royer NDP, Royer NC2, Royer JR
Royer NC4
American Sand Cutter, various sizes
3 Newaygo Handy Sandys HS7GT

SHAKEOUTS

Simplicity 6 x 8
Allis Chalmers 8 x 10
Simplicity 4 x 6
Simplicity 4 x 8

CORE BLOWERS

Redford No. 1 and No. 2
Champion, CB15
2—Chicopee Core Chief shell core blowers
Demmler No. 55, 1, 2K, 3E
Hansberg Shooter
Demmler 103EO w/feeder skip hoist, semi-auto cycle
Ross Vibra—Draws
Federal San Blo Pulsator, Model L40P1LPP
B&P Flexiblo, Model No. CB-10-DH w/ Universal Blo Plate

CORE OVENS

Tower oven, various sizes
Batch type, core & mold drying, various sizes
Porbeck 16-2B double and single end five drawer
Foundry Equipment, single end, 5 drawer
Porbeck C3C Double End and Single End, Oil Fired

CUPOLAS

Whiting No. 7 with Whiting No. 7 Inclined Skip Dump Charger, Spencer Turbo Centrifugal Blower 75 HP, Foxboro Air Weight Controller, Syntron Alloy Feeder, all new 1957, excellent.

Whiting Nos. 0, 2½, 4, 7, 9, 10
Cupola Blowers, various sizes
Modern swivel charger
Hauck cupola lighter
Series 1000 Bondactor
Cupoliner Model 1500

LADLES AND POURING DEVICES

Modern, Whiting, all sizes plus mixing ladle, electric tilt, cylindrical and tea pot lip pour

NON FERROUS FURNACES

#60 to #250 Crucible & Iron Pot Furnaces, stationary and tilt
Lindberg Fisher Electric Induction
Reda 1000# power tilt type reverberatory
Stroman 1200# Economelt gas fired
Stroman 1600#/hr. reverberatory, 1 station double chamber reverberatory
6000# Fisher Simplex reverberatory complete, gas fired
Lindberg Fisher NMP nose pour, 1000# capacity, gas fired

CLEANING EQUIPMENT

48 x 72 American Wheelabrator with skip and dust collector

42 x 48 American Wheelabrator
36 x 42 American Wheelabrator with skip & dust collector
27 x 36 American Wheelabrator with skip & dust collector
20 x 20 Air Blast Sly Barrel
36 x 72 Sly Tumbling Barrel, gearmotor drive
48 x 48 American Wheelabrator w/skip hoist
American 66" swing table
Pangborn LG 14, 6' table blast

GRINDERS

Marschke 2 x 24
U. S. No. 65, variable speed 24"
Gardner 54" surface grinder
Mummert-Dixon Swing 15 HP 3 x 24"
Gardner 36" opposed wheel surface grinder

AIR COMPRESSORS

100 HP XRB Ingersoll-Rand 2 stage, horizontal
175 HP XRE 2 stage, synchronous motor
30 HP Ingersoll-Rand horizontal
Gardner-Denver 15 HP, water cooled

AIR HOISTS

Ingersoll-Rand 700#, 1000#, 2000#, 4000# and 10,000#
Curtis Air Cylinder Hoists

ELECTRIC HOISTS

P & H 500#, 1000#
Comet 500#
Cleveland 1000#
Yale 1000#, 6000#
Budgit 1000#

MATERIAL HANDLING EQUIPMENT

Hough Payloaders HA Models
Hyster Forklift 2000#
Towmotor Forklift 7000#
Baker Electric platform 6000#
D. C. Electric Clamshell 1½ Yard
Clamshell Buckets ¾ & 1 Yard
39" Magnet
45" Bolted ECM Magnet
50" Bolted Ohio Magnet
130' of 30" roller conveyor, 3½ rollers, 6" centers, 4" channels
Michigan 12B Front End Loader

2—3 ton Shepard Niles overhead cab operated cranes, 47' span with runway and motor and generator.

TESTING EQUIPMENT

Pittsburgh Brinell Hardness Tester
Sand Testing Equipment
Speedy Moisture Teller
Detroit HB1 Brinell Hardness Tester
One complete Sand Testing Lab set

MACHINE SHOP EQUIPMENT

Cincinnati #118 automatic mill
Betts 52" Vertical Boring Mill, 2 loading arms
Bridgeport vertical milling machine
Niles Radial Drill 13" x 5' arm
American Radial Drill 14" x 7' arm
Peerless Power Hack Saws, all sizes

MISCELLANEOUS

Tabor cutoff saw 7½ HP
Tessmer, Obermayer, Perkins ¾", 1½" blades, sprue cutters
Walker Turner all angle cutoff saw
C & P core knockout
Magnetic Pulleys
Steel Flasks
Slip Flasks, Jackets
500# Print-O-Matic Dial

PATTERNS FOR PRODUCT LINE

Approximately 50 matchplates and other patterns to produce a line of brass plumbing supplies, all jigs, fixtures, dies and special tooling, approximately $7000 *cost* stock finished parts on hand, National Sales distribution of products produced, list of customers and sales representatives.

WANTED! GOOD SURPLUS EQUIPMENT . . . . .

One piece or a complete foundry—ferrous or non ferrous

Universal* MACHINERY AND EQUIPMENT CO.

large enough to serve you,
small enough to know you.

1632 North Ninth Street
Reading, Pa., Franklin 3-5103

• AIR COMPRESSORS
75 hp I.R. water cooled, horizontal
100 hp WORTHINGTON air cooled, 2 stage

• BLOWERS
CENTRIFUGAL 5 Hp to 30 Hp
GE, WILBRAHAM—GREEN FISHER Positive Pressure & Cent., Cupola Blowers

• BLAST CLEANING EQUIPMENT
15" Cont. WHEELABRATOR Tumblast
18GN PANGBORN Blastmaster, late
26" Cont. WHEELABRATOR Tumblast
20" x 27" WHEELABRATOR Tumblast
27" x 36" WHEELABRATOR Tumblast
36" x 42" WHEELABRATOR Tumblast
48" x 42" WHEELABRATOR Tumblast
48" x 48" WHEELABRATOR Tumblast
48" x 72" WHEELABRATOR Tumblast
1-A WHEELABRATOR Multi-table
72" WHEELABRATOR Swing Table
WHEELABRATOR Pipe Cleaning Cabinet
PANGBORN 5' LF Table
PANGBORN Air Blast Room 8' x 8' x 11'
6' LK PANGBORN Table Room
6' LG PANGBORN Table
9' LG PANGBORN Table
DUST COLLECTORS AND SKIP LOADERS AVAILABLE FOR ALL MACHINES

• CONVEYORS
CARRIER Oscillating, 18" W x 54' L
LINK-BELT, Car type mold, 114 cars, 403' track, car sizes 18" x 42"
SIMPLICITY 24" x 10' Feeder w/hopper, Model OA-10-JA2
Roller Conveyor—Ask for List

• CORE BLOWERS
DEMMLER #1, #2, #2A, #3K
INTERNATIONAL 8B-13
MILWAUKEE TACCONE #4-M
OSBORN #91, #192, #91-10
TACCONE #4D, 10" Draw Stroke Cyl.

• DUST COLLECTORS
COMPLETE STOCK cloth, dry and wet types; 1000 to 17000 CFM

• FURNACES
DIRECT ARC MELTING
500 lb. LECTROMELT Top Charge
1000 lb. SWINDELL, Door Charge
2000 lb. HEROULT
2000 lb. SWINDELL, 3/60 1000 KVA
1½ HEROULT
7' Top Charge Furnace
8' Top Charge Furnace
11' Top Charge Furnace

INDIRECT ARC MELTING
10# DETROIT
350# DETROIT LFA
750# DETROIT LFY, Conical Shell
1000# DETROIT AA
3000# DETROIT C, 500 KVA

INDUCTION MELTING & HEATING

175 KW AJAX Induction Melting Installation
Ideal for nonferrous work. With 2 lift coils. Can add standard tilt furnaces for steel.
SEND for complete details.

30 KW, ECCO Hi-freq. Vacuum Melting
30 KW, LEPEL, water cooled spark gap
40 KW AJAX Unit
35 KVA, AJAX Spark Gap, High Freq. steel
50 KW to 200 KW TOCCO Units
100 KW AJAX Production Heat Unit

GAS & OIL FIRED
400# FISHER, MNP
1000# HAUSFELD Hand Tilt, Oil fired, alum or magnesium
No. 900JC STROMAN, gas, Like new
6000# STROMAN, gas fired
20 Gas & Oil Fired Furnaces

HEAT TREATING
4' x 4' x 10' Gas Fired Annealing
210 KW LINDBERG conveyor box type
7' Rotary G.E. 200 K.W. 1950° F
36" x 36" West. Pit Type Electric
10" x 12" x 24" LINDBERG, 2500° F. Hyd
36 x 96, 48 x 120, 48 x 144 gas fired
Large Stock Gas Fired Box Heat Treating Furnaces

• PIT TYPE ANNEALING
42 x 96, 42 x 120 recirculating gas fired

• GRINDERS
DOUBLE END
3 Hp HISEY WOLF 3/60/220
5 Hp U.S. Model 64, 3/60/220
7½ Hp U.S. Model 66, 3/60/440
15 Hp MARSCHKE 220 volt
25 Hp KLING 3" dia. shaft
SWING FRAME
10 Hp SAFETY 24" x 3" wheel
15 Hp MARSCHKE 3/60/220-440
15 Hp MUMMERT-DIXON

• LADLES
BOTTOM POUR
MODERN 49" x 49"
MODERN Crane Type, 55" H x 50" top
MODERN Crane Type, 60" H x 60" top
LIP POUR
WHITING 28" x 28" top dia. geared
WHITING 29" x 29" top dia. geared
WHITING 52" x 52" top dia. geared
WHITING 33" x 33" top dia. geared
CYLINDRICAL
WHITING, 26" L x 25" dia, 1100# iron
WHITING, 19" L x 22" dia, 600# iron
WHITING, 38" L x 28" dia, 2200# iron

• MATERIALS HANDLING
BYERS Mobile Crane, BUDA Engine, 50' Boom, 5 ton w/magnet & bucket
HOUGH PAYLOADER, Model HA, 1000# cap., hyd. lift

• OVENS
ALLIS CHALMERS 20 KW, Model 750, dielectric
COLEMAN, Gas, 2 Comp. and 5 drawers, O.D. 22' x 12' x 10'
GIRDLER Thermex Dielectric Core Oven, 15KW w/36" W mesh belt
THERMONIC Dielectric Core Oven, 18 KW, w/40" wide mesh belt

• PRESSES
40 Ton FERRACUTE Sprue Cutter 1½" stroke
125 ton R.D. WOOD Down acting, 9" stroke
NIAGARA No. 82 Punch Press

• SAND CONDITIONING
B&P Nite-Gang
B&P Screenarator, Model "M"
LINK-BELT Revivifier
ROYER NB-2, 7-10 tons/hr., ¾ Hp.
ROYER, NC-2, 10-15 tons/hr, 1½ Hp
ROYER PREPARATOR, Comb., Model NDC, 25 ton/hr scrap removal 8' x 8' hopper
ROYER, NDP, 15-25 tons/hr, 2 Hp
ROYER, "NRP," 40-60 tons/hr, 5 Hp.

• SAND SLINGERS
B&P Stationary, Single Speed
B&P Tractor Type 19" Head
B&P Motive Jr., 2 speed, 19" head, 5" tip

• TESTING MACHINES
3000 Kg Gogan Brinell Testers

TOCCO SALE — INDUCTION HEATING UNITS

2—50 KW TOCCO 9600 cycle, 100 Hp motor
3—50 KW TOCCO JR, 2 station, 9600 cycle, 90 Hp motor
2—80 KW TOCCO JR, 2 station, 9600 cycle, 140 Hp motor
4—100 KW TOCCO JR, 2 station, 9600 cycle, 175 Hp motor
1—200 KW TOCCO JR, 1 station, 3000 cycle, 310 Hp motor

• MOLDING MACHINES
JOLT ROLLOVER PATTERN DRAW
DAVENPORT #408A, 40" x 60" table,
HERMAN 10,000#, 48" x 109" table
HERMAN 6000#, 42" x 78"
HERMAN 7500#, 40" x 50" table
HERMAN 3000#, 30" x 66" table
HERMAN 3000#, 32" x 70", 15" cyl. series charging conveyor type
HERMAN 1500#, 30" x 48" table
HERMAN 750#, 20" x 24" table
INTERNATIONAL 27" x 16", Type F, 22" x 64" table
INTERNATIONAL 43" x 16", type F, 42" x 72" table
INTERNATIONAL 31" x 16", Type F, 28" x 78" table
INTERNATIONAL 30" x 12", Type G, 28" x 35" table
INTERNATIONAL 13" x 17" table
J & J #610, 24" x 30" table
OSBORN #602, 36" x 26", 900#
OSBORN #444, 28" x 39" table, 1000#, port.
OSBORN #405, 3000#, flask 64" x 57"
OSBORN #243, 31" x 42"
TABOR 40" x 50" table, 3000# capacity
TABOR 22" x 42" pattern draw shockless, portable 600#
TABOR 20" x 30" w/air clamp 1000#
TABOR 14" x 16" Rockover 150#
PLAIN JOLT
INTERNATIONAL, 3' x 4' Table, 12" cyl.
TABOR 3' x 4' table
JOLT PIN LIFT
HERMAN #1317, 22" x 30" table
OSBORN #558, 21" x 24" table
OSBORN #540, 29" x 38" table
SPO #3058, 23" x 27" table
SPO #305, 750 lb. 20" x 27" table
TABOR 20" x 24" table, 600#
JOLT SQUEEZE PIN LIFT
INTERNATIONAL PKL, 20" x 28" table, 14" sq. 5½" draw
INTERNATIONAL PKL, 18" x 24" table, 12" sq., 5½" draw, stat.
MILWAUKEE #163, 15" x 24" table, 11" sq., 1500#
NICHOLS 18-44, 6½" draw
OSBORN #1024, 1800#, 10½" draw
OSBORN #716 PJ, 22" x 34" table 18" sq., 8" draw
OSBORN, #712J, #712PJ, 18" x 28" table, 12" sq., 6" draw, stat. & port.
SPO #2114P, 21" x 27" table, 600#
SPO #2116, 21" x 27" table, 11" sq.
JOLT SQUEEZERS
INTERNATIONAL #12 LJS, 16" x 20"
OSBORN #276-J & PJ, 17" x 26" table
OSBORN #275J, 16" x 20" table, 400#
SPO 113PJ, 18½" x 26" table
SPO #110J, 17" x 20" table, 400#
TABOR Squeeze-in Head, 16" x 19" table
TABOR Yoke Type, 18" x 26" table

• MULLERS AND MIXERS
B&P No. 3½ Mulbaro, 3½ cu. ft.
B&P #30 Speedmuller w/skip, 3 cu. ft
B&P #40 Speedmuller w/skip, 5 cu. ft.
B&P Conventional, SIMPSON type, 87½" Dia., arranged for cooling
B&P #70 Speedmuller, 15 cu. ft. w/cooling
CLEARFIELD #610, 6' dia., 14 cu. ft.
CLEARFIELD #920, 9' dia., 30 cu. ft.
SIMPSON #1, U.D., 4' dia., 4 cu. ft.
SIMPSON #1, Sep. Dr., 4' dia., 4 cu. ft.
SIMPSON #1½, Sep. Dr., 4'6" dia., 6 cu. ft.
SIMPSON #2, U.D., 6' dia., 14 cu. ft.
SIMPSON #3, 8' Dia. Sep. Dr. or U.D. 30 cu. ft.
WHIRLMIX 31" dia., 200 to 300 lb. sand

• SHAKEOUTS
2' x 10' HEWITT-ROBINS
3' x 10' SIMPLICITY
4' x 5' SIMPLICITY
4' x 6' SIMPLICITY
4' x 8' SIMPLICITY
5' x 6' HEWITT-ROBINS

• TRANSFORMERS (Furnace)
100 KVA KUHLMAN 13,200, 1/60
250 KVA WESTINGHOUSE 6600, 3/60
300 KVA WAGNER 4600, 1/60
500 KVA KUHLMAN 13,200, 1/60
800 KVA PENNA, 23,000, 3/60
1000 KVA WESTINGHOUSE 23,000, 3/60
1000 KVA G.E. 13,200, 3/60
2000 KVA WESTINGHOUSE 13,200, 3/60
5000 KVA WESTINGHOUSE 2300, 3/60
7500 KVA PENNA, 13,200, 3/60

• MISCELLANEOUS
AMERICAN "F" Rod Straightener, ⅜" to 1¼"
BLASTCRETE Model PM-1 Cupola Gun
CLIMAX Model 2-A Wire Straightener
CRESCENT Band Saw, 32" wheels
FLASKS, CORE PLATES, All Sizes
45" Magnet 230V. D. C.
MOULDER'S Hoppers, Various Sizes
SLY Rd. Tumb. Bbl. 68" x 32", 48" x 36" 69" x 39"

* Your *DEPENDABLE* Foundry Equipment Dealer

For More Information Circle 870, Page 39

THE ACME BARGAIN PAGE

BLOWERS
I.-R. 12900 cfm, 100 h.p. 220-440 V. 20 oz.
GE 10500 cfm., 20 oz., 85 h.p., 220 V.
GE 7500 cfm., 20 oz., 89.6 h.p., 220-440 V.
SPENCER 7350 cfm., 16 oz., 50 h.p.
GE Centrifugal 6200 cfm., 24 oz., 58 h.p.
6000 cfm. INGERSOLL-RAND 32 oz.
SPENCER 3500 cfm., 20 oz., 40 h.p.
SPENCER 2250 cfm., 16 oz., 15 h.p., 220
SPENCER 1350 cfm., 32 oz.
NORTH AMERICAN 1050 cfm., 16 oz.
NORTH AMERICAN 850 cfm.
500 cfm NORTH AMERICAN 12 oz.
McKee 200 cfm
2—SPENCER Turbo 50 hp 4800 cfm 24 oz.
2—SPENCER Turbo 50 hp 3600 cfm 24 oz.

CLEANING EQUIPMENT
48" x 48" AMERICAN w/skip
6' Table PANGBORN
AMERICAN #2 Tablast 8-28" tables, late
PANGBORN GD1-Airblast Barrel
88" PANGBORN double swingout table
SLY #4 Blast Mills

CONVEYORS
17' BARBER GREEN Bucket Conveyor
1500'—458 Chain w/drive, will sell all or part
24" x 13'-9" Magnet Belt

CONVEYORS, OSCILLATING
24" x 40' Ajax
SIMPLICITY 18" x 24'
SYNTRON 24" x 6'
AJAX 12" x 20'6"
36" x 11' Ajax
8" x 13' Ajax
3' x 10' SIMPLICITY OA-10A

CORE BLOWERS
CB15 55# cores, Universal blow plate
CB5-4# cores
DEMMLER #50
1—DEMMLER #55 w/vibratory hopper
2—DEMMLER #55 w/plain hopper
DEMMLER 2EO
DEMMLER 2K
FEDERAL "SAN-BLO" CB 40
INTERNATIONAL SB 15H, up to 150# cores. Hydraulic clamp and draw
INTERNATIONAL SB 13, up to 60# cores
6—OSBORN 193 up to 50# cores
REDFORD Bench #2 & #4

CORE GRINDERS
1—MILWAUKEE 70-9

CORE OVENS
THERMONIC INDUCTION MODEL 1800A
2—Despatch ET, Draw Type

CORE ROLLOVERS
2—INTERNATIONAL GR hand ram power rollover 22" x 24" x 10" draw
INTERNATIONAL REDP Rollover 12" draw
SUTTER #500

CRANES
2—WHITING 10 Ton cap. 107'3½" span, OETC Outdoor type
1—WHITING 3 Ton OETC Cupola Charge Crane, 20' span

CUPOLA GUNS
1—Bondactor #1250 and 1000

CUTOFF SAWS
UNUSED DEWALT CUTOFF SAWS for ferrous or nonferrous metals cutoff or as sprue cutters. Flush blade adapter takes up to 20" abrasive blade or saw. Power Hoist to arm. Chain & Sprocket cross feed for working on heavy cast iron 48" x 60" "T" slot table or off table cutting or large work. Motor swivels horizontal to vertical in yoke.

DUST COLLECTORS
ROTOCLONE 8D 2000 cfm 5 hp
SLY #11—590 cfm
ROTOCLONE 8B 2000 cfm w/after cleaner

ELECTRIC MELTING FURNACES
1—DETROIT "LFA" 350# shell 13200 V.
1—DETROIT "LFC" 700# and 350# Tapered Shell 2300 V.

FURNACES
400# Fisher Motorized Tilt, Gas Fired
600# Fisher Stationary
600# Campbell Hausfeld Brass

GRINDERS, MISC.
U.S. #70 Comb. 20" disc & 20"x3"x1½" wh
53" Hanchett Horizontal Disc
GARDNER 36" Vert Disc
BRADFORD Metalmaster 18" Disc
STANDARD 24" disc & snag

GRINDERS, SNAG
US #64 D.E. 20" x 3" x 10"
#5 Fox Sgl. Wh. 24" snag.
2—KLING type RT H.D. 24" x 3" x 12" D.E.
KLING H.D. 20" x 2" x 7" D.E.
5—#6 FOX Single Wheel 24" Snag
STANDARD 20" x 3" 7½ h.p.
STANDARD 30 h.p. Type 50—30" x 5"

GRINDERS, SWING FRAME
FOX 24" x 3" x 12"—15 h.p.
MARSCHKE 24" x 3" x 12" 20 h.p., 220 V.
U. S. 24" x 3" x 12" 15 h.p., 220-440 V.
2—MARSCHKE 3 h.p., 12" wheel

HEAT TREATING FURNACES
G. E. Elevator Type 1950° Atmosphere Generator 65" x 16' car. Electric. Late
G. E. Elevator type 2150°—96" x 144" car atmosphere generator. Electric. Late
3—ABBOTT 24" H x 22" Deep x 30" Wide, Gas Fired
HOLDEN #202 1850° Bright Hardening Annealing
HOSKINS 40 KW—1850°
25 KW Westinghouse 2000°

HOISTS
6000# Cleveland w/monotractor travel
6000# Electrolift
15—INGERSOLL-RAND 500# to 6000#
4—2000# R & M
1—500# Ingersoll-Rand LC-4

INDUCTION MELTING EQUIPMENT
30 KW Lepel Spark Gap

LADLES and POURING DEVICES
WHITING 16000# Crane
4000# Industrial Holding
WHITING 28 x 28—2300# Iron
MODERN 1000#—Geared Covered Crane
9—MODERN FA9 Pouring Devices 2000# cap.
6000# WHITING enclosed gear

MOLD BLOWER
TACONNE TD4 24" x 32" flask

MOLD CONVEYOR
366'—51—44" x 66" cars

MOLDING MACHINES
JOLT SQUEEZE PIN LIFT
6—MILWAUKEE 2646 Jolt Squeeze Strip rolloff—rolling molding machines 10" jolt cylinder; 1800# capacity, 26" Squeeze cylinder; 13" draw. Flask size 25½" to 29" wide, 52" long. FACTORY REBUILT.
MILWAUKEE No. 145-2, 27" x 30" table
8—OSBORN 712 PJ 18" x 28" table
1—CHAMPION JSL10P 18" x 21" table 6" draw

JOLT SQUEEZERS
MILWAUKEE 181-7, 24" x 36" table
MILWAUKEE #162—1, 900 lbs. cap.
2—113 PJ SPO
OSBORN 275PJ
25—124 MILWAUKEE Portable Jolt Sq.
6—104 MILWAUKEE Portable Jolt Sq.
8—MILWAUKEE 103-5 17" x 26" table

JOLT ROLLOVER DRAWS
2—918 J & J 2000# cap. 20" draw
643 OSBORN 2000# cap. 20" draw
40" TABOR 2000# cap. 15" draw
30" TABOR 1000# cap. 12" draw
SPO 506
34A DAVENPORT
DAVENPORT 24SA 900# 24" x 28" table
HERMAN 3000#
2—750# HERMAN 20" x 30" table
INTERNATIONAL RJ 20" x 12"

JOLT SQUEEZE ROLLOVER DRAW
OSBORN 331-332-333
SPO 413D
INTERNATIONAL RES

PLAIN JOLT
36" x 60" Herman

JOLT PIN LIFTS
1536 MILWAUKEE 1500# cap. 12" draw
1030 MILWAUKEE

MULLERS and MIXERS
1½ SIMPSON U.D. Model 700#
1—#3 UD Simpson
3—#2 Simpson UD
#40 B & P w/skip and water meter
#60 B & P Rebuilt mtr. & starter
CLEARFIELD #404
1—#2 SIMPSON OG
CLEARFIELD #610

ROLLOVERS
HERMAN 46" x 112" charge conveyor rollover 56" draw, late

SAND CONDITIONERS
AMERICAN 51"
ROYER NDC—ND2
SCREENARATORS L

SAND SLINGERS & EQUIPMENT
3—19"—2 speed Stationary
1—14' Turntables
3—7' Plate Feeders, 35 & 45 Tons
B & P 44-44 Speed Draw 12" draw

SAND SYSTEM EQUIPMENT
28' Newaygo Bucket Elevator 12" x 7"
3—7' B&P Plate Feeders, 35 & 45 Tons
2—18" x 52' Magnetic Belt
4' x 8' SIMPLICITY ring crusher screen

SAWS, BAND
30" LAIDLAW, Metal Cutting hydraulic

SCALES
FAIRBANKS charge scale 11250# cap.

SHAKEOUTS
6' x 10' SIMPLICITY, Som—11, Spring Mounted

4 x 8 LINK-BELT
2' x 8' Double Deck
4 x 6 LINK-BELT
6 x 10 HEWITT-ROBINS

SHELL EQUIPMENT
SHELL PROCESS 20" x 30" pattern size w/shell blender and bonding press

SPRUE CUTTERS
1—MILWAUKEE #85 TON
OBERMAYER 2 H.P.

STRAIGHTENING PRESS HYDRAULIC
225 ton Southwark
150 ton Farquhar "C" Frame
60 ton Lempco 4 post
25 ton Fox
25 ton Dennison

TESTING EQUIPMENT
ARLIN Automatic Rockwell, continuous
COLEMAN 55 Spectrophotometer
GOGAN Model 1414-2V

TUMBLING BARRELS
ROTO-FINISH Model DW 45-36
SLY, 24" x 48"; 3 H.P.
SLY, 30" x 60" Duplex

WOODWORKING—PATTERNSHOP
OLIVER #290 Dbl Arbor, Tilt-Arbor Saw
1—OLIVER 182D, 15" Disc Sander
CRESCENT 24" planer
6", 8", 12", 20" and 30" Jointers
24" x 36" Band Saws

OLIVER Model 103
PATTERN MILLER

ACME

ACME EQUIPMENT CO., INC.

We will buy for cash a single piece of equipment or your entire plant

125 South Clinton Street • Phone: ANdover 3-3430 • Chicago 6, Illinois

MONA

PARTIAL LISTING OF EQUIPMENT NOW AVAILABLE — INQUIRIES INVITED

SAND MULLERS

CLEARFIELD

MODEL	PAN. DIA.	CAPACITY
404	4'	400#
610	6'	1500#

BEARDSLEY & PIPER

MODEL	CAPACITY	AIR COOLED
30	4 cu. ft.	Yes
30	4 cu. ft.	No
60	12 cu. ft.	Yes
60	12 cu. ft.	No
70	15 cu. ft.	No
80	20 cu. ft.	Yes

ALL CAN BE EQUIPPED WITH DUST HOODS, SKIP HOIST LOADERS, MULTRAMATIC CONTROLS, ETC.

SIMPSON

MODEL	PAN. DIA.	CAPACITY	DRIVE
1½	4'-6"	700#	UD
2	6'	1500#	Encld.
3	8'	3000#	UD
3	8'	3000#	Encld.
3½	9'-3"	5000#	UD

ALL CAN BE EQUIPPED WITH NATL. ENG. SKIP HOIST LOADERS.

LANCASTER

MODEL	PAN. DIA.	CAPACITY
EA4	59"	9 cu. ft.
EBG-4	59"	9 cu. ft.

OSCILLATING CONVEYORS

AJAX ENGINEERING (Lo-Veyor)

MODEL	SIZE	CAPACITY in T P H
LC 24-6-7	24" W x 7' L	70
LC 36-6-9DA	36" W x 9' L	100
LC 36-6-14 DA	36" W x 14' L	100

SIMPLICITY ENGINEERING

OA-10-JA	24" W x 13' L	150
OA-10-JA	24" W x 11' L	150
OA-10-JA-2	30" W x 7' L	150
OA-10-JA	30" W x 13' L	100
OA-10-A	36" W x 10' L	200
OA-10-A	36" W x 16' L	200
OA-10-A	36" W x 25' L	600

SANDSLINGERS

B&P Stationary, Model "DB," 5' jib arm, 4' ram, 19" head, 5" cup, 2-speed, 20/13 HP. Raising & lowering arms or fixed.
B&P Stationary, Model "DB," 8' jib arm, 4' ram, 19" head, 4" tip, 20/16 HP. Raising & lowering arms or fixed.
B&P "Motive Jr.," 11' jib arm, 4' ram, 16" head, 4" cup, R & L arms, 2-speed, 20/13 HP.
B&P "Motive," 15' jib arm, 9' ram, 2-speed, 25/16 HP. With Raising & Lowering.

SPECIAL!

EXCEPTIONAL PURCHASE • INGERSOLL-RAND AIR HOISTS FROM LEADING GOV'T. INSTALLATION • SAVE MORE THAN 50%

QUAN.	MODEL NO.	CAP.	PRICE
6	A	500#	259.50
5	B	1000#	279.50
17	C	2000#	439.50
21	D	4000#	539.50
13	D-6	6000#	739.50
7	E	10,000#	939.50

All w/top hooks for hanging; Trollies and Air Trollies, Extra. A-430

CUPOLA BLOWERS

INGERSOLL RAND

MODEL	C F M	PRESSURE	HP
FS-337	3000	20 oz.	25
FS-365	4500	16 oz.	30
FS-355	6000	16 oz.	40
FS-387	10,200	20 oz.	75
FS-377	10,500	20 oz.	85
FS-565	14,100	40 oz.	200

ROOTS CONNERSVILLE

RCR	1040	20 oz.	10
RCS	9075	32 oz.	100

RAREST OPPORTUNITIES! LATEST DESIGN & METHOD! NOW AVAILABLE!

These listed below are exceptional purchases we have been fortunate in making. Equipment of this caliber has never been offered on the Used Market. Savings of 40 to 60%.

DIELECTRIC CORE OVEN

1—COLEMAN Model CD-75 Dielectric Core Oven 10' Wide 40' Long x 7' High—Mesh Belt Conveyor Type. Belt width 5'—Work area 64" Width x 19" High opening. Power required 165 KVA, 3 Phase, 60 Cycle, 460 Volts. Unit new in 1957 and used less than 3 years. Acquisition cost over $44,000.00—In Like New Condition—Save more than 50%.

TUMBLAST

1—AMERICAN 48" x 72" Tumblast, 30 cu. ft. load cap. Complete w/skip hoist loader. Serial #A99334. New 1956—Used very little.

AMERICAN WHEELABRATOR

size	capacity (cu. ft.)	
27 x 36	5	w/skip hoist
36 x 42	11½	w/skip hoist
48 x 42	17½	w/skip hoist
48 x 72	30	w/skip hoist

TABLASTS

AMERICAN #1—4' Plain Table
PANGBORN 6LG-14—6' dia. w/6-24" aux. tables
PANGBORN 9LG-14—9' dia. w/6-36" aux. tables
PANGBORN 6LK—6' dia.—72" swing-out table
PANGBORN 6LF—6' dia.—Plain Table

SAND MULLERS

1—B&P #70 Speedmullor, 18 Cu. Ft. Batch Cap. Air Cooled, w/Skip hoist load. New 1951.
1—CLEARFIELD #920 Sand Muller, 9' pan dia., 3000 # batch cap.

INDUCTION MELTING FURNACES

2—AJAX 20 KW Induction Melting, convertor type, 3000 cycle, w/two 20# furnaces.
5—AJAX 150 KW Induction Melting Furnaces, 440 V, 60 cycles. 1000 to 1200# brass cap.
6—AJAX Model CS-1 35 KW Induction Melting & Holding Furnaces. 800# holding cap., 175# melting cap.
4—TOCCO 15 KW, 10,000 cycle, 15# fur. Will melt 12# steel in 19 min.
1—AJAX 333 KVA, 960 cycle Induction Melting Installation. With all controls, capacitors, etc. Will melt 1000# in 60 min. With 2000# cap. fur.
1—10# HORACE DREVER Indirect Arc Melting Furnace, 3000°F with controls and transformers.

ELECTRIC DUPLEXING FURNACE

1—WHITING 10 ton Hydro-Arc Furnace for Duplexing Malleable Iron from cupola, 10' dia. shell, motorized tilt 9" dia. electrodes, cap. 18 to 23 ton per hour, w/Allis-Chalmers 2000 KVA transformer, 12,000 volt-motorized tap charger. New 1953.

HANDY SANDYS

NEWAYGO SHS-4-G Super Handy Sandys, Single Hopper, 15 cu. ft. capacity, 4' receiving hopper, 21' elevator. NATIONAL ENGINEERING Moulders Helper. Twin Hopper, 3000# capacity, each air operated gates. Model B.

JOLT ROLLOVER PATTERN DRAW

DAVENPORT

MODEL	TABLE SIZE	DRAW	CAP.
24 SA	24" x 38"	12"	1000#
28 SA	28" x 40"	12"	1500#
34 A	34" x 58"	15"	2500#
48 A	48" x 82"	24"	6000#

INTERNATIONAL

AN	40" x open	20"	4500#

JOHNSTON & JENNINGS

612	24" x 30"	12"	600#
815	30" x 40"	15"	1200#
918	44" x 54"	20"	2000#
1020-RC	50" x 60"	20"	3000#

OSBORN

242-W	29" x 42"	12" to 19"	1500#
244	35" x 52"	16" to 25"	3000#
405	57" x 64"	26"	3000#
442	21" x 31"	10"	600#
601	24" x 30"	10"	900#
602	30" x 36"	12"	1200#
643	35" x 50"	20"	2000#

SPO

505	18" x 23"	6½"	400#
506	24" x 25"	10"	600#

TABOR

MODEL	TABLE SIZE	DRAW	CAP.
22"	22" x 32"	10"	600#
22"	22" x 42"	10"	600#
30"	30" x 40"	12"	1000#

JOLT PIN LIFT MACHINES

DAVENPORT

MODEL	TABLE SIZE	DRAW	CAP.
34 A-JS	36" x 46"	12"	2500#

INTERNATIONAL

JDP 1200x8	24" x 26"	8"	1200#
JDP 3000x10	48" x 48"	10"	3000#
JL	32" x 52"	12"	2000#

JOHNSTON & JENNINGS

68-SP	25" x 30"	8"	600#

MILWAUKEE

1030	28" x 34"	8"	1000#
1536	32" x 38"	10"	1500#
2036	32" x 38"	10"	2000#
2542	38" x 42"	12"	3000#

OSBORN

540	32" x 52"	12"	2000#
560	32" x 45"	12"	2500#

SPO

3070	28" x 35"	10"	1500#

JOLT SQUEEZERS

MILWAUKEE

MODEL	TABLE SIZE	SQ. CYL.
104	18" x 15"	10"
123	17" x 26"	12"
141	20¼" x 30"	14"
181	24" x 36"	18"

OSBORN

275-J	16" x 20"	10"
276-J	17" x 26"	13"

SPO

110-J	17" x 20"	10"
113-P	18⅛" x 26"	13"

JOLT SQUEEZE PIN LIFT MACHINES

MODEL	TABLE SIZE	DRAW	DIA.	CAP.
PKL-12	18" x 24"	5½"	12"	600#
PKL-14	20" x 28"	5¼"	14"	1000#
PK-16	20" x 30"	8"	16"	1700#

MILWAUKEE

125	21" x 27"	8"	12"	1200#
145	24" x 30"	8"	14"	1700#
195	28" x 39"	10"	19"	3000#
196	16¾" x 39"	10"	19"	3000#
214	20" x 32"	10"	21"	2500#
244	22" x 32"	12"	24"	3000#
245	35¼" x 42"	12"	24"	5900#
246	23¼" x 42"	12"	24"	5900#

OSBORN

710-PJ	16" x 25"	6"	10"	500#
712-PJ	18" x 28"	6"	12"	750#
714-PJ	20" x 31"	7"	14"	1000#
716-PJ	22" x 34"	7"	16"	1250#

SPO

2114-P	20" x 27"	4"	11"	600#
2136	21" x 30"	6"	13"	800#
2146	23" x 31"	6"	14"	1000#

JOLT SQUEEZE ROLLOVER DRAW

MODEL	TABLE SIZE	DRAW	CYL.	CAP.
MILWAUKEE				
167	32" x 33"	12"	16"	1000#
217	35" x 41"	12"	21"	1200#
OSBORN				
332	28" x 36"	9"	16"	750#
333	32" x 45"	11"	19"	1400#
SPO				
413-C	24" x 25"	10"	13"	600#
917-A	26" x 36"	9"	17"	750#
9546	26" x 32"	12"	16"	1000#

a MACHINERY AND EQUIPMENT COMPANY

"Built on a Foundation of Mutual Trust"

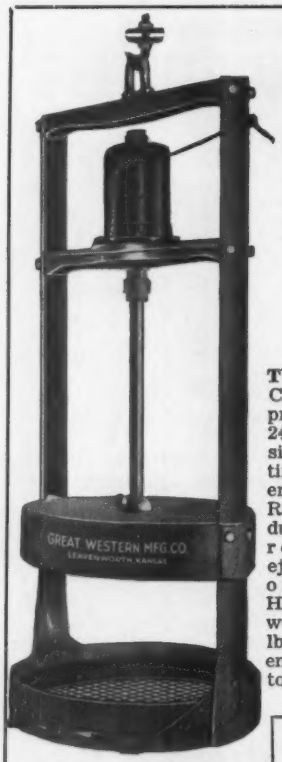
10900 CEDAR ROAD • CLEVELAND 6, OHIO • SW 1-3900

For More Information Circle 872, Page 39

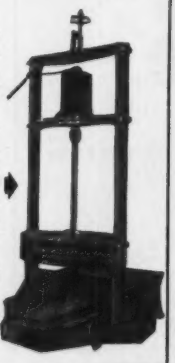
RUGGED DURABILITY AND PRECISION ACCURACY!

Combs Gyratory Riddles

"Greatest Name in Motion"



TYPE "CS". Complete price $435.00. 24" square sieve. A continuous operation sieve. Requires no dumping, as refuse is ejected off to one side. Height 4'10", weight 295 lbs, ½ H.P. enclosed motor.



TYPE "CR". Complete price $425.00. 24" dia. round sieve. Sifts, fluffs, mixes, aerates sand. Height 4'6", weight 250 lbs., ⅓ H.P. enclosed motor.

TYPE "HL". Price $315.00 complete, less sieves. Laboratory model especially designed for laboratory sand control, fitted with 1/6 H.P. enclosed motor.

PROMPT DELIVERY from your Foundry Supply House

TYPE "V". Price, 20" Sieve, $330.00. Does the work of 10 men. Screens sand, Fine, Medium, and Coarse. 20" dia. sieve with special clamp for 5-second changes. Height 4'6", weight 100 lbs., fully-enclosed 1/6 H.P. motor. Also available in Giant V-5 with 36" sieve for triple capacity . . . Price $600.00

MAIL THE COUPON NOW!

GREAT WESTERN MFG. CO.

Leavenworth, Kansas Phone MU-22291

☐ Send Additional FREE Information

NAME

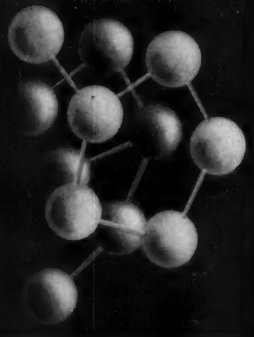
ADDRESS

CITY STATE

For More Information Circle 723, Page 39

WHEN DIMENSIONAL STABILITY OF CASTINGS IS CRITICAL . . . SPECIFY

ALMAG 35



STABILIZATION AT 700 F. PROVIDES ABSOLUTE STRESS RELIEF AND DIMENSIONAL STABILITY WITHOUT LOSS OF PROPERTIES OR MACHINEABILITY.

Dimensional instability in aluminum alloys results from permanent growth or heating and locked up stresses. Aluminum silicon alloys may be degrowthed by heating to 450° F. and complete stress relief is obtained by heating to 700-800° F. However, most aluminum alloys subjected to that treatment become soft, have low physical properties, and are not machineable.

In contrast with age hardened alloys, Almag 35 is an aluminum-magnesium casting alloy which immediately as cast has full high strength and high shock resistance, retaining these properties for the life of the casting. Because of its composition, it is not subject to growth on heating...and when heated to 700-800° F. for five hours and cooled in still air becomes dimensionally stable and at the same time retains its full hardness, physical properties and machineability.

Therefore, Almag 35 is the ideal alloy for casting components of instruments, computing devices, and other equipment where dimensional stability is of prime importance.

WRITE TODAY FOR FREE BULLETIN

WILLIAM F. JOBBINS INCORPORATED

J

P. O. BOX 230B
AURORA, ILLINOIS

DISTRIBUTED IN CANADA BY ALUMINUM COMPANY OF CANADA, LTD.

For More Information Circle 724, Page 39

Advertising Index

AWS Foundry Supplies & Equipment 216
Acme Foundry Co. 192
Adams Co., The 164
Air Reduction Co., Inc., Pure Carbonic Co., Division 55
Airetool Manufacturing Co. 57
Ajax Flexible Coupling Co., Inc., Conveyor Division 152
Ajax Magnethermic Corporation 115
Allentown Pneumatic Gun Co. 109
Allied Chemical Corporation, Semet-Solvay Division 133
Allis-Chalmers Mfg. Co. 117
Alloy Metal Abrasive Co. 140
Aluminum Company of America 179
American Bridge Division, United States Steel Corporation 176, 177
American-Marietta Co., Presstite Division .. 5
American Optical Co., Safety Products Division 199
American Smelting and Refining Co., Federated Metals Division 43
Ansco, A Division of General Aniline & Film Corporation 135
Arcair Co. 46
Archer-Daniels-Midland Co., Federal Foundry Supply Division 48, 123
Arrow Butt Co. 202

Bartlett-Snow-Pacific, Inc., Foundry Engineering Division .....Back Cover
Beardsley & Piper, Division of Pettibone Mulliken Corporation 47, 211
Behr-Manning Co., A Division of Norton Co. 59
Berkshire Chemicals Inc. 202
British Moulding Machine Co., Ltd. 213
Brown Metals, Inc. 21

C & S Products Co., Inc. 186, 187
Campbell-Hausfeld Co., The 222
Carborundum Co., Bonded Abrasives Division 90
Cardox, Division of Chemetron Corporation 144, 145
Carman, Edwin S., Inc. 221
Carver Foundry Products, Inc. 173
Cedar Heights Clay Co. 108
Centrifugal Casting Machine Co. 219
Chain Belt Co., Carrier Division 162
Chase Foundry & Manufacturing Co. 221
Chemetron Corporation, Cardox Division 144, 145
Chicago Pneumatic Tool Co. 141
Cincinnati Milling Machine Co., The, Cincinnati Milling Products Division 125
Cincinnati Milling Products Division, The Cincinnati Milling Machine Co. 125
Clearfield Machine Co. 149
Cleveland Chaplet & Mfg. Co., A Division of F. Hohlfelder Co. 154
Cleveland Electro Metals Co. 214
Cleveland Flux Co., The 197
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 101, 102
Cleveland Vibrator Co., The 139
Corn Products Co., Industrial Division .. 155
Cratex Manufacturing Co., Inc. 143

DeBardeleben Coal Corporation 222
Diamond Alkali Co. 217, 219
Dietert, Harry W., Co. 222
Durez Plastics Division, Hooker Chemical Corporation 183

Eastman Kodak Co., X-Ray Sales Division 151
Eriez Manufacturing Co. 106

Fanner Manufacturing Co., The 98, 99
Federal Foundry Supply Division, Archer-Daniels-Midland Co. 48, 123
Federated Metals Division, American Smelting & Refining Co. 43
Ferro Corporation, Louthan Manufacturing Co., Division 202
Foundry Engineering Division, Bartlett-Snow-Pacific, Inc. Back Cover
Foundry Equipment Co., The 14
Foundry Supplies Manufacturing Co. 50
Fremont Flask Co., The 54

Gardner-Denver Co. 51
General Aniline & Film Corporation, Ansco Division 135
General Foods Corporation 22
General Services Administration 234
Goodrich, B. F., Industrial Products Co. 53
Gordon, Claud S., Co. 165
Great Western Mfg. Co. 232
Green, A. P., Fire Brick Co. 180

Hanna Furnace Corporation, The, A Division of National Steel Corporation 190, 191
Harbison-Walker Refractories Co. 11
Hartley Controls Corporation 223
Hercules Powder Co., Inc. 9
Herman Pneumatic Machine Co. 130, 131
Hickman, Williams & Co. 182
Hines Flask Co. 33
Hoeganaes Sponge Iron Corporation 201
Hohlfelder, F., Co., Cleveland Chaplet & Mfg. Co., Division 154
Hooker Chemical Corporation, Durez Plastics Division 183
Hough, Frank G., Co., The 129
Humble Oil & Refining Co. 89
Hunt Valve Co., A Division of International Basic Economy Corporation 16

Inductotherm Corporation 42
Industrial Equipment Co. 214
International Basic Economy Corporation, Hunt Valve Co., Division 16
International Foundry Supply Co. 148
International Nickel Co., Inc., The 194

Jeffrey Manufacturing Co., The 36
Jobbins, William F., Inc. 232
Johns Manville Corporation 147
Johnson, Matthey & Co., Inc. 156
Joy Manufacturing Co. 87
Joy Manufacturing Co., Western Precipitation Division 49

Kaiser Aluminum & Chemical Sales, Inc., Kaiser Refractories 153
King Tester Corporation 152
Kirk & Blum Mfg. Co., The 12
Knight, Lester B., & Associates, Inc. 120
Koppers Co., Inc. 45

FOUNDRY

Penton Building, Cleveland 13, Ohio
Main 1-8260

FRANK G. STEINEBACH
Publisher
Editorial Director

BUSINESS STAFF

EARL H. THOMAS
Advertising Director
MARY JANE KIMPEL, Advertising Service Mgr.
DAVID D. GIBBS, Market Research Mgr.
J. M. CASTIGLIONE, Production Mgr.
BETTIE COOK, Circulation Mgr.
DONNA REYNOLDS, Classified Advertising Service
G. R. EBERSOLE, Distribution Mgr.
MILDRED CHRISTOPHER, Census Mgr.
VIRGINIA B. HARMS, Staff Asst.
JANET SANDROCK, Staff Asst.
VIRGINIA T. YOUNG, Staff Asst.
JUNE SCHILENS, Reprint Service

Branch Offices

New York 17 .....60 East 42nd St.
J. F. AHRENS, J. L. OZANNE
Murray Hill 2-2581

Chicago 11 .....520 N. Michigan Ave.
A. W. JOHANSEN, L. R. HETKE
Whitehall 4-1234

Cleveland 13 .....1213 West Third St.
K. L. MOUNTAIN, A. L. KLINGEMAN
Main 1-8260

Birmingham 9 .....249 La Prado Place
F. J. ALLEN, Tremont 1-8598

Los Angeles 36 .....5943 West Colgate Ave.
F. J. FULLER, Webster 1-6865

San Francisco 4 .....57 Post St.
ROBERT W. WALKER CO., Sutter 1-5568

Detroit 35 .....15800 West McNichols Rd.
THOMAS H. DOENGES, Broadway 3-8150

Pittsburgh 19 ..... Koppers Building
JOSEPH C. SULLIVAN, Atlantic 1-3211

Clearwater, Fla. .....1954 Jeffords Drive
H. G. ROWLAND, Dial 441-4121

Dallas 35 .....525 Exchange Bank Building
JAMES H. CASH, Fleetwood 1-4523

London .....2 Caxton St., Westminster, S.W. 1
JACK C. G. CRUMP

Published monthly by

THE PENTON PUBLISHING COMPANY

GEORGE O. HAYS .....Chairman
RUSSELL C. JAENKE .....President
FRANK G. STEINEBACH ...Vice Pres. and Secretary
FRANK O. RICE .....Vice President
JOSEPH P. LIPKA .....Vice Pres. and Treasurer
DAVID C. KIEFER .....Vice Pres.—Marketing
IRWIN H. SUCH .....Vice Pres.—Editorial
ROBERT L. HARTFORD .....Vice President

Also publisher of STEEL • MACHINE DESIGN
NEW EQUIPMENT DIGEST • AUTOMATION

FOUNDRY is edited primarily for management, production, technical and purchasing personnel in foundries. A copy is sent at no cost to each metal casting plant in the U. S. and Canada employing 20 or more workers and to selected smaller foundries. Additional copies are sent to each foundry to the extent necessary to serve key foundry personnel on an individual or routed basis. A limited number of copies is supplied at no cost to educational institutions.
Subscriptions in the U. S., possessions, and Canada for home-addressed copies and copies not qualified under the above principles: One year, $10. Single copy, $1. Other countries; One year, $20. Single copy, $2.

Member
Business Publications Audit Inc.
National Business Publications Inc.
Industrial Advertising Research Institute

BPA NBP

For Sale

U. S. GOV'T SURPLUS

STEEL FOUNDRY

Located in San Francisco Bay Area Industrial tract between Pittsburg and Antioch, California
Formerly Pacific Ordnance Steel Foundry

SEALED BID OPENING SEPTEMBER 13, 1961 (3:00 P. M. PDT)

★ Ready to operate Steel Foundry consisting of 31-Foundry, Utility and Admistrative buildings on approximately 41.146 acres. Buildings and equipment maintained in a "ready status." ★ Strategically located in rich, Pittsburg-Antioch Industrial Area and adjacent to existing Columbia-Geneva Steel Mill, Shell Chemical Co., U. S. Steel, Linde Air Products, Pacific Gas & Electric, etc. ★ 50 minutes from San Francisco-Oakland Bay Area with easy access via State routes #24 and #4. Proposed freeway will link area with Oakland within a few years. ★ Adequate existing residential area housing industrial workers nearby . . . new residential sub-divisions developing rapidly. ★ Served by Santa Fe Railroad spur track. Located near shipping channels. ★ Attractive Financing.

WRITE OR TELEPHONE FOR INVITATION, BID & ACCEPTANCE FORMS NO. GSA-UDS-9-LB-1 AND DESCRIPTIVE BOOKLET TODAY.

GENERAL SERVICES ADMINISTRATION

Public Buildings Service • Business Service Center
49 Fourth St. • Phone YUkon 6-3500, Ext. 3204
San Francisco, California

THE METALLURGY OF STEEL CASTINGS

By Charles W. Briggs

625 pages,

334 illustrations

Price $13.00 Postpaid

A comprehensive work giving detailed data on the chemistry, metallurgy and technology of steel castings. Provides complete information on methods of technical and industrial control in production of steel castings and describes every manufacturing process used.

FOUNDRY

Book Department
1213 W. 3rd Street
Cleveland 13, Ohio

For More Information Circle 725, Page 39

Advertising Index

Lanly Co., The 192
Latella, D. C., & Associates, Inc. 223
Leuthan Manufacturing Co., A Division of Ferro Corporation 202

Mag-Alco Foundry 222
Magnaflux Corporation 142
Magnet Cove Barium Corporation 32
Manhattan Rubber Division, Raybestos-Manhattan, Inc. 174
Marison Co., The 166
Marshall, L. H., Co. 216
Mayer, Carl, Corporation, The 207
Metal Blast, Inc. 215
Metal & Thermit Corporation 221
Metallizing Company of America, Inc. 217
Milwaukee Chaplet & Mfg. Co. 175
Minnesota Mining and Manufacturing Co. 35
Modern Equipment Co. 236
Murphy, Jas. A., & Co., Inc. 220

National Acme Co., The, Shalco Division .. 60
National Engineering Co. ....Inside Front Cover
National Steel Corporation, The Hanna Furnace Corporation Division 190, 191
New York & New Jersey Lubricant Co. .. 134
Newaygo Engineering Co. 96
Nomad Equipment Corporation 185
Norton Co. 112, 113
Norton Co., Behr-Manning Co., Division .. 59
Norton Co., Refractories Division 13

Ohio Ferro Alloys Corporation 56
Osborn Manufacturing Co., The 168, 169
Ottawa Silica Co. 28

Pangborn Corporation 44, 128
Peabody Engineering Corporation 34
Penn Iron Works, Inc. 219
Permanent Mold Die Co. 107
Pettibone Mulliken Corporation, Beardsley & Piper Division 47, 211
Pickands Mather & Co. 93
Picker X-Ray Corporation 214
Pittsburgh Coke & Chemical Co., Coke & Iron Division 15
Planet Corporation 171
Presstite Division, American-Marietta Co. .. 5
Pure Carbonic Co., A Division of Air Reduction Co., Inc. 55

Raybestos-Manhattan, Inc., Manhattan Rubber Division 174
Redford Iron & Equipment Co. 8
Republic Steel Corporation 6, 7
Reynolds Metals Co. 1
Robeson Process Co. 220
Rudow Manufacturing Co. 218

Schneible, Claude B., Co. 2
Scientific Cast Products Corporation, The .. 216
Security Alloys Co., Inc., Foundry Division 109
Semet-Solvay Division, Allied Chemical Corporation 133
Shalco Division, The National Acme Co. .. 60
Sherwood, H. J., Inc., Sherwood Refractories Division 170
Sherwood Refractories, Division of H. J. Sherwood, Inc. 170
Sidley, R. W., Inc. 220
Simonds Abrasive Co., Division of Simonds Saw and Steel Co. 184
Simonds Saw and Steel Co., Simonds Abrasive Co., Division 184
Simplicity Engineering Co. 41
Smith, G. E., Inc. 158
Smooth-On Manufacturing Co. 218
Speer Carbon Co., Carbon Products Division 160
Spo, Inc. 24, 25
Standard Electrical Tool Co., The, Foundry Grinder Division 118
Standard Horse Nail Corporation 140
States Engineering Corporation 220
Sterling National Industries, Inc. 27
Stevens, Frederic B., Inc. 58, Inside Back Cover
Superflux Mfg. Co. 185

Taccone Corporation 204
Taylor, S. G., Chain Co., Inc. 10
Therm Ice Corporation 119

U. S. Smelting Furnace Co. 200
Union Carbide Corporation, Union Carbide Metals Co., Division 127
Union Carbide Corporation, Union Carbide Plastics Co., Division 209
Union Carbide Metals Co., Division of Union Carbide Corporation 127
Union Carbide Plastics Co., Division of Union Carbide Corporation 209
United States Electrical Tool Co., The .. 218
United States Graphite Co., The, Division of The Wickes Corporation 52
United States Rubber, Mechanical Goods Division 30, 31
United States Steel Corporation, American Bridge Division 176, 177
United States Steel Corporation, Subsidiaries 176, 177
United States Steel Export Co. 176, 177

Vanadium Corporation of America 138

Wadsworth Equipment Co. 143
Wedron Silica Co. 95
Western Precipitation, Division of Joy Manufacturing Co. 49
Wheelabrator Corporation 193, 195
Whirl-Air-Flow Corporation 189
Whitehead Metals, Inc. 161, 163, 165
Whiting Corporation 137
Wickes Corporation, The, The United States Graphite Co. Division 52
Wilson Welding Co., Inc. 110
Wirebound Box Manufacturers Association Inc. 124

Classified Advertising 223, 224, 225, 226, 227, 228, 229, 230, 231

1961-1962 EDITION OF

PENTON'S FOUNDRY LIST and DIRECTORY

PRICE $150.
PER COPY

IS NOW AVAILABLE

The new 1961-62 edition of PFL published by FOUNDRY magazine is now available. This directory gives comprehensive information on all the 5,879 metal casting plants in the U. S. and Canada (including die casters). It tells who they are and where they are located; what metals they cast, their melting equipment capacities, departments operated, etc.

Well-indexed, and in loose-leaf form, PFL is indispensable to casting buyers and foundry suppliers.

ORDER NOW FOR IMMEDIATE DELIVERY

Penton's Foundry List Order Form

Book Dept. FOUNDRY, 1213 West Third St., Cleveland 13, Ohio

Check enclosed ☐ Purchase Order No. _____

Please send us one copy of the new 1961-62 Edition of Penton's Foundry List @ $150 a copy.

Copies shipped postpaid insured book express. Purchasers in Ohio only add 3% Ohio State Sales Tax. Advertisers in FOUNDRY receive 33-1/3% discount from $150 List Price.

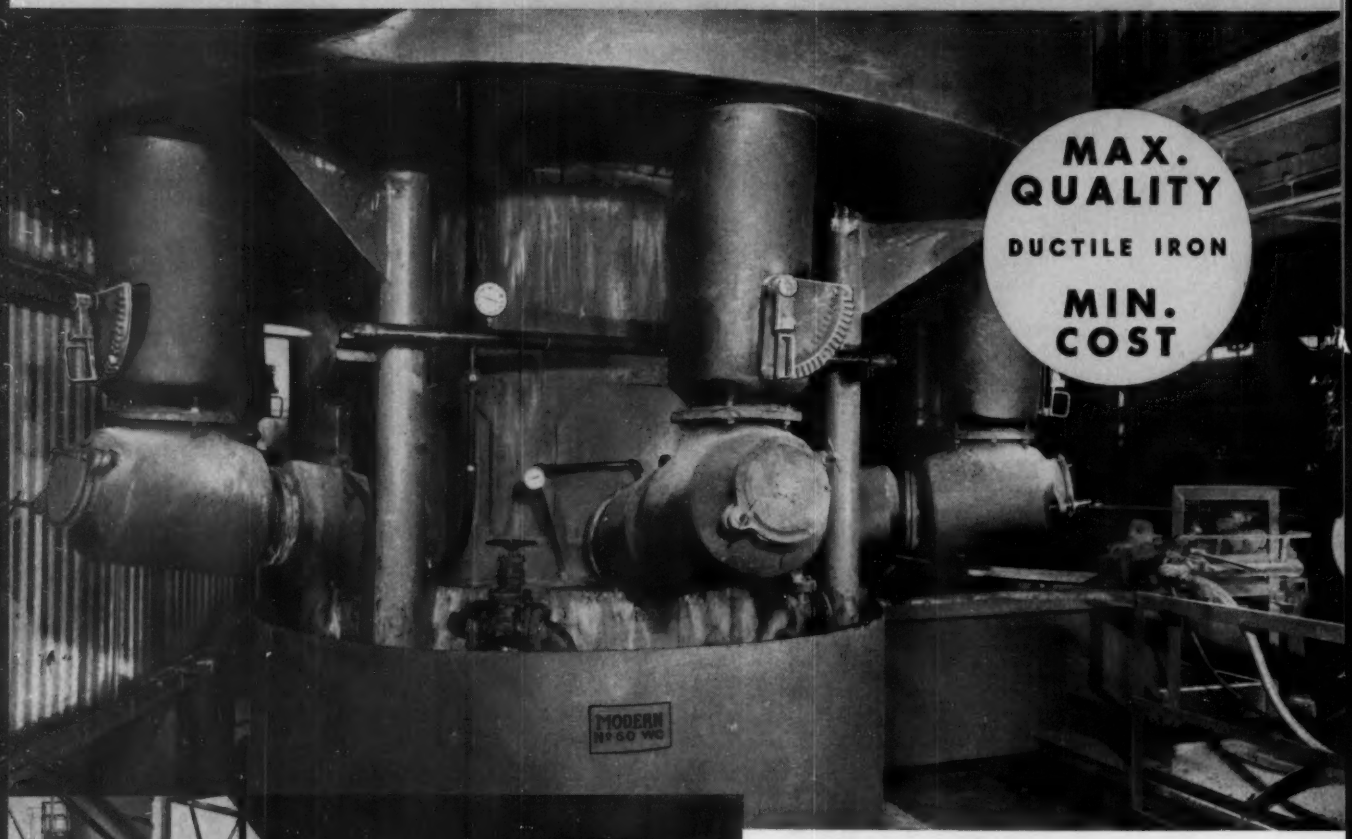
NAME OF COMPANY _____

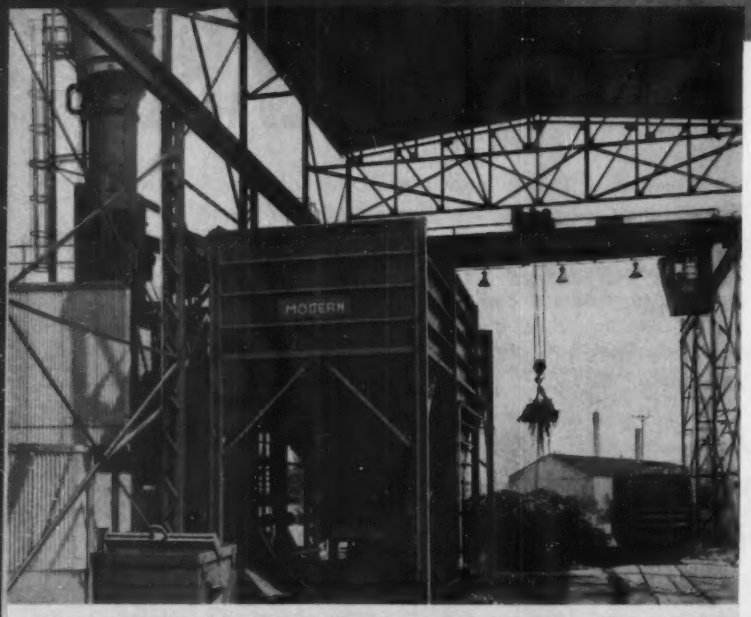
STREET ADDRESS _____

CITY _____ ZONE _____ STATE _____

For More Information Circle 726, Page 39

WATER-COOLED CUPOLA OPERATION—benefited by hot blast . . .





Skip charger with 42" x 42" small-cone bucket. 7½ ton, 50 ft. span magnet crane services the bins.

Overhead traverse is synchronized with conveyor for electrified pouring.

CHARGING . . .
MELTING . . .
POURING!

For the ALL-NEW Briggs & Stratton Foundry in Milwaukee the choice favored ALL-MODERN equipment for charging . . . melting and pouring — 60" water-cooled cupola melting; 750° F., externally-fired, hot blast; 42" x 42" small-cone bucket for charging; and MODERN ladles for holding, inoculating and conveyor line, electric pouring. Melting progresses against the water-cooled, steel shell. Slag composition is completely independent of lining effects. Metallurgical control is assured. Labor is minimized by the MODERN skip charger which operates complete with small-cone, orange-peel bucket; automatic weighing; coke and flux bins: Served by a 7½-ton magnet crane. Whenever new and unusually tough problems arise in your selection of equipment, which is engineered metallurgically as well as mechanically to your requirements, we'd like to think with you in your early-stage planning. May we send catalogs?

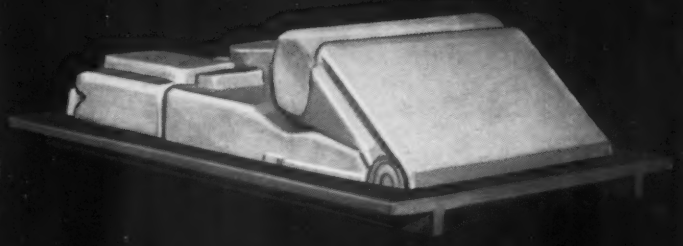
MODERN

MODERN EQUIPMENT CO., Dept. F-9
Port Washington, Wisconsin

For More Information Circle 727, Page 39

STEVENS GRAPH-Z CORE WASH

CUTS CLEANING ROOM COSTS AT GARDNER-DENVER

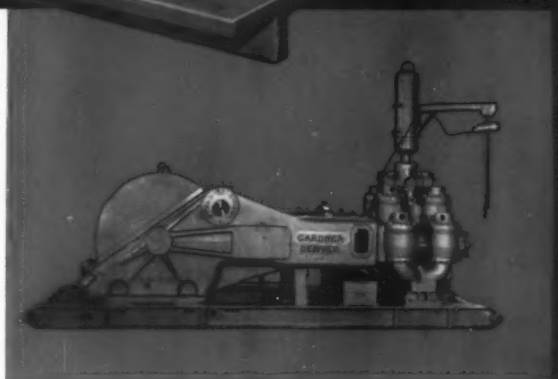


- Eliminates metal penetration and sand burn-in
- Assures clean peel of sand from castings
- Leaves no white surface film on finished castings

Cope and drag cores for slush pump bases weigh approximately 10,000 pounds.

The Gardner-Denver Company, world-renowned manufacturer of oil field equipment, depends on Stevens Graph-Z Core Wash to produce smooth, clean castings for its famous deep-drilling slush pumps. The result: better castings that require fewer cleaning-room operations prior to final finishing!

Write today for information on Stevens complete line of core washes and other foundry products. Or, contact your Stevens representative . . . he'll show you how you, too, can produce better, cleaner castings and reduce overall foundry costs!



Gardner-Denver Model GXP Deep-drilling Slush Pump.

EVERYTHING FOR THE FOUNDRY

frederic b. **STEVENS,** inc.

DETROIT 16, MICH.

BUFFALO CHICAGO DETROIT MILWAUKEE CLEVELAND
WALLINGFORD (CONN.) INDIANAPOLIS SPRINGFIELD (OHIO)

For More Information Circle 555, Page 39

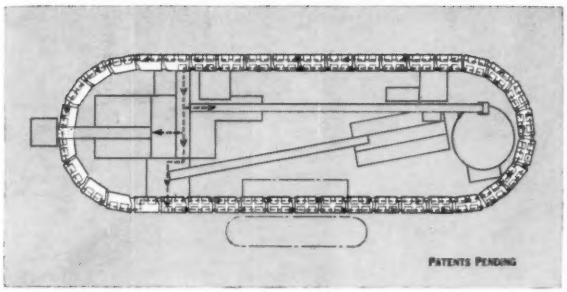
PROFITS SQUEEZED?

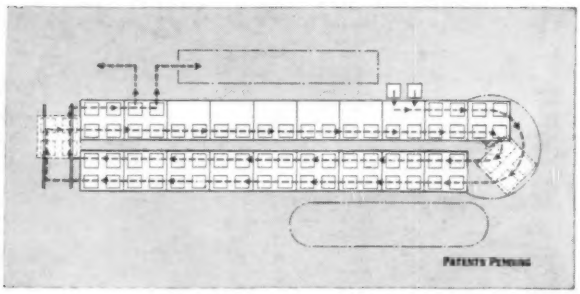
Modernize Your Foundry with a Cost Reducing

BARTLETT SNOW PACIFIC MOLD HANDLING SYSTEM

"Double MLC" Mold Handling System

Snap or tight flask molds are set out in outside position on the car, poured, and travel almost completely around the loop. They are then transferred automatically to inside position on the car, and continue around the loop again for automatic removal at the shakeout. These new systems provide almost twice the cooling time of a conventional mold conveyor carrying only a single line of molds; effecting substantial savings in floor space, equipment, building, and other facilities.



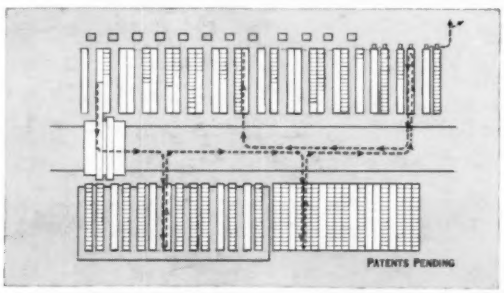


"Double MRI" Mold Handling System

Rectangular loop, consisting of two straight runs connected with a rotary turn and transfer car. Cars advance one car length, then remain stationary for timed period so large molds can be loaded onto the conveyor, poured, and the molds removed, while the conveyor is stationary. Molds are carried side by side on the cars and make almost two complete trips around the loop, thus nearly doubling the cooling time per square foot of floor space.

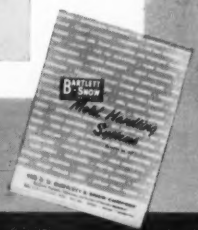
"MF" Mold Handling System

Unlimited flexibility for jobbing foundries. The transfer car delivers pallets loaded with similar molds, to the pouring, cooling, and shakeout zones, and returns the pallet with the bottom boards and bands—or flasks—to the molding area. Handling similar molds together permits molds for different castings to be kept separate, and even poured with different metals, without interfering with other groups of castings. Slow jobs do not hold up the fast jobs. Molding, pouring, cooling and shakeout are centralized, minimizing the equipment requirement.



B-S-P
ENGINEERED EQUIPMENT

Write for Bulletin No. 135 Today! It describes eight B-S-P Mold Handling Systems.



Foundry Engineering Division

BARTLETT-SNOW-PACIFIC, INC.

6200 Harvard Ave.
Cleveland 5, Ohio

3100—19th Street
San Francisco 10, Calif.

351 Fifth Ave.
New York 17, N. Y.

Designers, Engineers, Fabricators and Erectors of Foundry Equipment